THE

ELECTRICAL REVIEW.

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ELECTRICAL REVIEW.

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EXPORT TRADE AND LONG CREDIT.

MANUFACTURERS who interest themselves in export trade know only too well that one of the principal difficulties with which they have been confronted in certain foreign markets has been the unconscionably long credit system employed by the German organisations. British manufactures might for a given case be all right as to suitability and quality, delivery and even price, but if very generous terms of settlement have been offered by Teutonic suitors, terms which no British or American would accept, this has frequently clinched the matter and the business has passed us by. There seems to be a peculiar readiness among the people of certain countries to deal with those who will give the longest time in which to pay, even though there be a substantial rate of interest charged on the amount of the debt—a sort of mutually agreed upon, and, from our point of view, painfully protracted moratorium. Twenty-five years ago, when British traders had a far freer scope in foreign markets, credit was not allowed over anything like the length of time that has now become too usual. In those days several months was, we believe, almost the limit for the average exporting manufacturer or merchant. The period that has elapsed since then has witnessed the development of the German spirit of world dominance no less in trade affairs than in national policy, and those who have been in commercial active service so long have observed the change that has gradually come over the methods of international trade. Authorities in the different quarters of the globe, where the competition for orders has become so terribly keen, have written home advising the readers of the ELECTRICAL REVIEW that it was largely the German long-credit system which had made the British position so much more difficult than it used to be. Of course Germany's electrical organisations have been under-cutting in price, but credit, credit, and again credit has seemed to be a leading part of German policy, and unless the purchaser was absolutely determined to have British-made goods, an easy way could be found to his heart when he saw the financial and commercial advantage of being allowed to pay just when he pleased. Consular and other Government advisers have given the same advice as our own contributors, urging British manufacturers and traders to strain in every possible way to meet this phase of competition. Indeed, it is advocated again this week in a Government report mentioned in our "War Items." In certain cases such advice has been acted upon and the system, evil in itself, has been extended and encouraged thereby. But the differences in organisation obtaining in this country and in Germany have often compelled small British manufacturers to admit the impossibility of their attempting to defeat long credit by means of still longer credit. German industrial consolidation and amalgamation, and the close relations of

finance and industry which became possible in consequence thereof and because money was more freely available to assist industrial effort—these strengthened if they did not actually create the system.

The time is opportune for again considering this matter very seriously. There is room for gravely doubting whether extended credit is good for the purchaser, though with that aspect we need not concern ourselves at the moment. What is more interesting is whether it is satisfactory for the country which has encouraged the practice in the hope of gaining a permanent footing in markets from which it desired to oust us. Even more important is our own attitude toward the policy in view of present events in Europe. An illuminating article on the position considered from the point of view of the manufacturer appears in the current issue of the *Engineer*. The writer refers to occasions on which German firms have in some engineering lines been allowing two, three, four and five years' credit, and he gives particulars of what we should imagine is the limit—a case in which *ten* years was allowed! German tenderers meant, at all costs, to secure an order for two gas engines for a municipality in Italy. When they offered to accept instalments spread over 10 years the British firms withdrew, and the order went to Germany. According to British standards and beliefs, business on those conditions was best left alone.

By the war on the Continent, German manufacturers are for the time being, at all events, eliminated from the world markets. The writer of the *Engineer* article, after expressing the conviction that the death struggle will leave Germany absolutely exhausted financially and unable to hamper us with her trade competition for years to come, says that whereas in the past British exporters must have sustained heavy losses through being compelled to follow their rivals' methods, and give unwholesome terms of credit, the position has now been greatly altered by the sudden withdrawal of their only important rival, and that the rival responsible for the long-credit system. It is hoped, therefore, that in their efforts to take advantage of the unprecedented chance of expansion of exports, they will realise that "the main reason of the credit cancer that has done so much harm, is gone," and that "a pernicious system that was forced on us by our enemy, should be abolished for good now that the opportunity offers itself." British firms in pursuit of foreign business are urged not to try to outbid one another by again granting extended credit, and the larger firms in the engineering industry, whose financial ability would enable them better than smaller concerns to grant favourable terms, would be doing a great deal to relieve the situation and lead to the removal of the system for many years if they would fall in with the suggestion, and compete with other Home firms on industrial rather than on financial merit. It may be thought that this attitude ignores the activities of the American exporter, but, so far as we can recollect, the long-credit system has seldom been indulged in by American firms. Indeed, we believe that they have been criticised by their own advisers repeatedly for their unwillingness to give what we regard as ordinary export credit. Ready money appeals to the American business man, whose foreign trade efforts have never been so startling that they need be feared just now; at any rate, America need not be regarded as a factor to be seriously reckoned with in any efforts that Britishers may contemplate making to stamp out the system which allows the purchaser to pay for his purchases perhaps years after he has worn them out and put them on the scrap-heap.

Of course, most of our future action in this connection will be controlled by what emerges in Germany. If that empire, which at present seems to give to English eyes signs of very sure and certain crumbling, all that is hoped for in freeing the industrial market from German financial battering rams may be reasonably expected to follow. But even if we assume a different result from the conflict, the lesson of the danger of unduly extended outside credit in all parts of the world will have been learned by our enemies themselves. In concluding our present reference to the subject, we quote the *Engineer* writer's comment on this point:—

To Germany this war will bring home the peril involved by the very credit system which she advocated and used as a weapon against her rivals; she must have many millions of pounds outstanding on long terms of payment in countries with which she is at present engaged in war, or which have been so crippled in consequence of this conflict as to be unable to face their engagements, and it is difficult to see how she will contrive—whatever the outcome of the campaign itself may be—to recover any appreciable portion of this sum. Let us hope that this lesson will not be lost on British trade.

The German people may not be so great industrially in the future as they hoped to be. The revulsion of feeling against them throughout practically the entire world may compel them to beat their swords into ploughshares (their dislike for bayonets is well known), and engage more generally for a time in agricultural pursuits. But we shall do well to analyse, as the weeks pass by, just what the Teutonic commercial procedure in the past has been. Wherever possible we may be sure German officials will try hard, by fair means, and, perhaps, by foul, to work their way into positions in which they can influence the placing of business, and we may anticipate that in Germany nothing short of frantic measures will be adopted for saving the life of German export industries. But crippled by financial weakness, disgraced as nation never was before in the eyes of civilised and uncivilised alike, will those measures avail in our day? We trow not. The fate of Louvain, the ruin at Rheims—we regard these as presages of Germany's downfall, industrially as well as nationally.

CO-OPERATION IN TRADE EXPANSION.

In the absence of any definite information regarding associated efforts that may be on foot for beginning or extending electrical trading operations in the lands of our Allies, and those other markets where Germany before the war was doing a large business, we place ourselves at the service of British electrical manufacturers. Somebody must take the initiative in matters of this kind. As a preliminary step, therefore, we invite firms who have sympathy with, or are prepared to act co-operatively in, any new effort that may be made, to communicate with us. Though the nations are still at war and little in the direction of actual pursuit of new business can be done for the time being, we can proceed to deliberate seriously, perhaps prepare a plan of campaign and gather together the necessary forces ready for definite operations to begin at the psychological moment.

We can quite imagine that some of our electrical and allied manufacturers will regard the proposition of getting into so many new markets all at once as too big for them to tackle as individual units of the industry. Undoubtedly it is so—it is useless disguising the fact; but in co-operation many things are possible that individuals cannot do alone. Two kinds of co-operation occur to us. A dozen or so manufacturers of different classes of machinery or goods might collectively, by one or two efficient representatives sent to each market, study the whole of these

markets simultaneously—say, first of all, Russia, Belgium, France, Spain; or they might send a stronger representation to study each in turn. They would be sure of a hearty welcome from the electrical engineering and trading fraternity in these countries as soon as things began to settle down, and as the result of inquiries and fraternisation, might be able to prepare excellent reports, or arrive at definite opinions and conclusions which it is not easy to form as a result of reading general Consular dispatches, or studying the position from afar.

We have no doubt that some will regard this as an almost insane suggestion at the present juncture, but any movements of this character necessarily take considerable time to organise, for there is much to be done by way of preliminaries. Shortly after daybreak on the morning after the expiration of the ultimatum to Germany, we saw the British Navy start out upon its wonderful mission of national protection from which it has not yet returned, and a few hours thereafter hundreds of ships, with decks cleared ready for action, awaited the approach of the invader. What our representatives at Westminster said was backed up immediately—why? Because we were ready! There were no preliminaries to delay us then. Among our other national attributes we still possess some ability as a "nation of shopkeepers," though the shops are just a trifle larger than they were when Napoleon first dubbed us so with uncomplimentary intent. We talk of "capturing" trade, let us not be less ready in our trade callings than our legislators in theirs, to follow up our talking with action. We urge our readers to prepare themselves for carrying the electrical trade war into the countries we have named, by beginning to organise their forces straight away. We have already received inquiries from some firms who are eager to get into these Continental markets if they can only find others who will act with them, and we should like to witness the making of a strong effort along these lines. The land has got to be surveyed, its people must be known and trade relations with them cultivated, and the extent to which existing British manufactures are, or are not, suited to the market, and what measures need to be taken to meet new requirements, are matters for the fullest investigation on the spot.

We shall be pleased to do whatever we can to bring together those who desire to consider the taking of joint action, and if our preliminary measures succeed, to leave the matter for those directly concerned to develop fully along their own lines.

Repenting at Leisure.

It is a matter for satisfaction that as the weeks pass by and we become gradually accustomed to the state of war, there is both the time and the disposition to devote to our domestic industrial concerns that maturer reflection to which we referred recently. Repentance at leisure, though it may not remove entirely the consequences of the action which occasioned it, is undoubtedly satisfactory, whether it be the outcome of "representations" respecting "the dominant feeling of members," or whether it be made possible by the publication of a new proclamation by the King. That proclamation did not materially alter the sentiment or principle of the earlier announcement referred to in our leading article of September 4th respecting trading with the enemy, but we are glad that it was issued, if only to allow the British Electrical and Allied Manufacturers' Association to avoid both an injustice to individual firms and a weakening of its own collective forces. Indeed, it may be open to question whether the incident has not to some extent undermined the prestige of the Association as a representative organisation; if it be so, probably any effect of that kind could be lastingly removed by the adoption of really thorough schemes for carrying electrical trade war into the countries of Europe, and for meeting the demands for *new* requirements hitherto dealt with in Germany or Austria—schemes conceived in the interests of the entire British electrical industry, and not conducted with too much secrecy.

Prospects in the Egyptian Market.

On another page statistics are given of the imports into Egypt of goods which are of interest to electrical manufacturers. An examination of these is encouraging to those at war with German trade, as it will disclose the fact that last year its influence in many lines was waning. In steam engines and boilers Germany makes but a poor showing. Her imports in 1913 were less than half her 1912 totals, whereas Great Britain's sales increased by more than 50 per cent. Even in electrical machinery and petrol and benzine motors Germany imported little more than half the value that Great Britain did, whilst under the classification "other machinery (except agricultural)" she lost considerable ground last year to our manufacturers. It is to the lamp trade that the efforts of British manufacturers require to be directed, as here, in spite of a decline in the total Egyptian demand, Germany last year managed to extend her sales. Again, in telegraphic and telephonic apparatus, Germany turned the tables on us.

Rubber.

It is hardly to be expected that the rubber market would show any great activity under the circumstances, and in view of this the course of affairs has been just about what was looked for. There has been a certain amount of buying done by the home trade, but the broad outlines of the market have been decidedly quiet. The position in the East has not been pleasant, and it is known that a certain amount of rubber has been compulsorily cleared off, the buyers being located in America, and the selling coming from Singapore and Colombo. The satisfaction of American demands from this direction has necessarily led to a suspension of buying in the London market, which is at the same time bereft of a good deal of the support met with formerly from Continental centres which are now practically closed. Under all the circumstances, the price has stood up very well indeed, and first latex on the spot is quoted in London about 2s. a lb., with forward at a fraction less. Para descriptions are still held for very high prices, comparatively speaking, and as much as 2s. 8d. is named for spot, with 1½d. a lb. or so less quoted for distant delivery. There is a good deal of the lower grades of rubber about, and this in the absence of any vigour about the buying has tended to cause a slacker feeling.

Private advices which have come to hand, speak of very high prices being current in Germany, where up to 4s. a lb. is spoken of for first latex plantation crêpe. There is not the least doubt that the demand in Germany has already far outstripped the supply, but this is only one of the consequences of the deliberate policy of the Kaiser, and there is every reason to hope that the German position will grow much worse before it is better. The situation of the rubber market in Germany must now be getting exceedingly difficult, owing to the enormous drain upon the stocks of material, and the impossibility of replenishing them.

By an order in Council which has been issued, exports of raw rubber from the United Kingdom are forbidden to all ports in Europe and on the Mediterranean and Black Seas, with the exception of those of France, Belgium, Spain and Portugal and Russia (Baltic parts excepted), and direct imports into Germany are impossible owing to the naval position. Holland will possibly be amenable to the blandishments of the Germans, but it is doubtful whether any considerable quantities will enter German territory through this

channel. An indication of the position in Berlin is to be found in the instructions issued by the Berlin Board of Charity, impressing upon physicians for the poorer classes the necessity of economising surgical bandages. Parchment paper is ordered to be used instead of rubber, and the prescription of rubber bandages is forbidden. The importance of the German trade in rubber is to be gauged from the fact that last year the imports into that country were about 29,000 tons, and the re-exports about 10,000 tons, which means that the country consumed about 19,000 tons a year.

The exports of rubber from the F.M.S. for the eight months of the year are 11,415 tons, against 7,248 tons in 1913 and 3,279 tons in 1912.

The U.S.A. and the War.

Singular views have gained currency amongst our American cousins with regard to the European war, especially in respect of the position of the British nation. We have already quoted some passages from the *Electrical World*, which indicate that our contemporary regards us, industrially speaking, as *hors concours*, and philanthropically calls upon American manufacturers to come to the aid of the neutral nations which can no longer obtain electrical goods and apparatus from the European sources upon which they have hitherto relied. In the same issue Dr. Louis Bell, who is so well acquainted with Europe that he ought to know better, states that the United States is "the only nation upon which war has not laid the hand that strangles." He remarks that the war "removes from the ranks of labour every workman of active years who is not absolutely needed to provide material of war in every country having compulsory military service." But it is not true even in such countries. The *Vorwärts*, apparently the only German paper that publishes unpleasant facts, estimates that at least a third of the working men in all the large towns in Germany are unemployed, and the number is increasing. Germany's export trade has been arrested by our Navy—but ours has not; we are at liberty to supply goods to the whole of the world that is not at war. "So far as active commercial work goes," says Dr. Bell, "one may as well reckon every door as closed in all the warring Continental countries"; but, happily, we are not Continental, and he recognises that "such residuum of the British works as may be able to keep up activity . . . . will hold up with fair success" since England controls the seas and possesses freedom of transportation. Dr. Bell concludes that the electrical trade of South America will turn to the United States as the only large source of supplies remaining, and urges that the United States should not provide loans for the promotion of bloodshed, but save up its capital "for the promotion of the world's [*sic*] industry when peace comes at last." Other articles in the *Electrical World* are devoted to a study of trade conditions in South America, which certainly seems to be the prize that the United States has its eye on.

The *Engineering Magazine* for September similarly harps upon "America's opportunity in an Old-World Catastrophe," and publishes a "war map of the world," showing how small a proportion is left open to peaceful commerce. To arrive at this result, not only the European countries, but the *whole of the British Empire* and all Africa are shaded to show that they are affected by the war—as if Canada, Australia, South Africa, India and the rest were under martial law! The writer of a special article, Mr. H. Emerson, says, without any hypocrisy about rescuing the neutral world from ruin for want of European goods, "the national opportunity of a millennium is ours"! But he also deplores the unpreparedness of his nation, and points to South America as the golden opportunity. In an editorial note the same view is taken, that England is paralysed as well as the Continental States, and "the United States must become both granary and workshop for all the world."

We grieve to prick this brilliant bubble, but it is our painful duty to point out to the United States, and incidentally—more important in effect—to all the consuming countries of the world outside Europe, that we are *not* out of the running. We are giving of the best of our young manhood to the war, it is true, but our manufactories are not idle, our export trade is not strangled, our hands are not tied. We are ready and willing to fill orders for all kinds of electrical machinery and apparatus, cables, lamps, batteries—we want good prices for our wares, but we will supply good value. Our motors are not like the German motors, rated at 5 H.P. and fit to work at 3; our cables are of quality unexcelled. We are at war not only with the sword, but also with the order-book, and we look to all friendly and neutral nations to buy from us the things that they used to purchase from our present enemies. We can make them and we can transport them, and all this talk about our being paralysed is utterly mistaken. We do not say it is deliberately false, but it is untrue all the same.

NOTES FROM CANADA.

[FROM OUR SPECIAL CORRESPONDENT.]

After recovering from the first shock of the declaration of war this country is beginning to steady itself and, as in England, business men and manufacturers are being urged to keep their employees on as far as possible to work for stock, and generally to make every effort to keep things as normal as possible.

It is inevitable, of course, that there should not be some dislocation of business, and quite a number of factories are closing down altogether, while others are putting their employés on short time.

The Department of Trade and Commerce at Ottawa is issuing memoranda pointing out that there are likely to be openings for extended trade with the United Kingdom; these are said to have met with immediate response, enquiries having come in from all over the Dominion. The Government is now considering the question of cancelling German patents.

Municipalities are holding meetings to consider ways and means of keeping men employed, and of finding work for those who are already out. The Dominion Department of Agriculture is impressing upon all farmers the necessity of sowing as much seed as possible, in order that Canada may be in a position to supply much extra grain to Europe next year, and also that work may be found for many who might otherwise starve. Probably amongst the people who are suffering most from the effects of the war are Canadian agents for goods, etc., manufactured in Germany and Austria-Hungary; not a few of these deal in electrical materials and appliances, etc.

Of course, many efforts are being made to form rifle corps and other bodies for the training of men in military matters; the engineers are not backward in this respect. One noteworthy move has recently been made by the staff of the Hydro Electric Power Commission of Ontario, over 80 of whose members have, at the first mention of the subject, signified their readiness to start training in rifle shooting, drill and military engineering. The question is to be taken up with the authorities in Ottawa at once.

The "Canadian Engineer" reports that a representation of a syndicate of British steel merchants is over here trying to ascertain whether Canadian manufacturers can stop the gap caused in the building trades by the paralyzing of imports from Germany and other Continental countries; and it also states that the Minister of Trade and Commerce is trying to arrange for the capture by Canadian manufacturers of some of Germany's great trade in South America, Australia, and South Africa. The general opinion here seems to be that as soon as peace is declared Canada stands to gain enormously by the altered trade conditions of the world.

THE MANUFACTURE OF TANTALUM AND WOTAN LAMPS.

We recently paid a visit to the Dalston works of Messrs. Siemens Bros. & Co., Ltd., to see how they make their well-known "Tantalum" and "Wotan" lamps. The works are situated in Tyssen Street, not far from Dalston Station, and are admirably adapted for their purpose, the rooms being lofty and well-lighted, and arranged on a plan providing for the maximum convenience and accessibility. In this building the manufacture of metallic-filament lamps has been carried on for the past six years, beginning with the tantalum lamp, of which the Siemens companies have maintained the monopoly, and which is still manufactured in large quantities, and adding to it the tungsten lamp when the latter was introduced. Labour is readily obtainable in the neighbourhood, and the nature of the work, together with the good wages offered, enables the company to attract workers of an exceptionally high class; the bulk of the employés, of course, are women and girls, who acquire remarkable skill and dexterity in handling the delicate parts of the modern metallic-filament lamp. Their labours are greatly facilitated by the free use of machines; it is not possible to adapt the operations involved in the shaping and joining of glass parts to entirely automatic machines, but a remarkably large proportion of the work can be effected by mechanical means, enabling the output per operator to be immensely increased. The management, however, makes a point of retaining always a certain amount of hand labour in connection with each process, in order to be safeguarded against all possible eventualities. Necessarily the company had to train almost all the employés, as there is no surplus of trained lamp makers in the labour market to draw upon.

Gas for the blow-pipes is obtained from the public mains, and electricity is provided by the company's own plant. The rooms are ventilated by means of electric fans, and a complete system of Grinnell sprinklers guards against the danger of fire.

The various processes of manufacture of the tantalum and tungsten lamps are generally similar; each lamp consists essentially of three parts: the foot, the filament, and the glass bulb. The foot is made up of the flanged sealing-in tube with leading-in wires, and the spider to support the filament. One of the most interesting details in the modern lamp is the seal, which is effected by a tiny piece of platinum wire fused to two copper wires. It is a singular fact that until recently platinum was the only substance with which a permanently tight seal into glass could be effected, and it is still almost universally employed for this purpose, in spite of its high cost, but the amount required has been ingeniously worked down to the minimum. In tantalum lamps the spider arms are of copper wire, but in tungsten lamps one set of arms is made of constantan alloy, and the other of very fine molybdenum wire. The connection between the filament and the copper electrodes is made by inserting the ends of the filament into the tubular ends of the electrodes, and pinching the latter with corrugating pliers, making a sound mechanical joint. The operations of pinching the seal, and joining the foot to the bulb, both of which require great care, are partly effected with machines, which enable women to do work which in the early days had to be done by skilled men. Exhaustion is carried to the highest degree practically attainable, whilst the bulbs are enclosed

Fig. 1.—Making the Spiders.

Fig. 3.—Stemming the Bulbs.

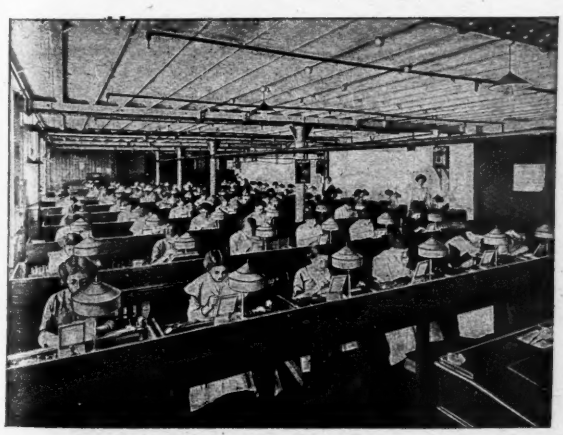


Fig. 2.—Winding Filaments.

Fig. 4.—Exhausting.

in a heating cap, to drive off air and moisture from the interior surface of the glass. After sealing-off, it is usual to run the lamps at a pressure considerably above their normal voltage for a time, to "age" the filaments. Every lamp is tested for voltage and candle-power, at the current strength appropriate to the size of filament. The caps are fixed on not with plaster, as in the old days, but with a molten compound. Practically all lamp-makers, we believe, use brass caps made in Holland; with this exception, the Siemens lamps are made entirely of British materials, the firm having a large interest in a British glass-works, and using British tungsten wire. The completed lamp is finally tested again for vacuum, continuity and candle-power, before being wrapped in paper and put in store. The company has a large stock of lamps at Tyssen Street, and also has stores for a large quantity of lamps in Shacklewell Lane, close by. At present the works are very busy, having Admiralty contracts in hand as well as the ordinary demand. The tantalum lamp retains its popularity for many purposes, especially where severe vibration is present; a special traction lamp, for instance, is capable of withstanding violent shocks such as in practice could only be brought about, we should think, by a collision. We reproduce herewith some photographs of the works, which give a good idea of their internal appearance and arrangement.

CORRESPONDENCE.

Letters received by us after 5 P.M. on Tuesday cannot appear until the following week. Correspondents should forward their communications at the earliest possible moment. No letter can be published unless we have the writer's name and address in our possession.

Capturing German Trade.

As an engineer working about 14 hours a day in the endeavour to recover for this country the trade lost by us to Germany, I feel sure that my recent experiences are worth noting. I find, in short, that British capitalists and manufacturers have in no collective sense "woke up," and that it is just as difficult as ever to arouse any active enterprise or speculative effort to meet the crying need in this country.

I cannot find anyone willing to finance overcrowded works of existing profitable aluminium or brass die-casting businesses.

I cannot induce manufacturers to depart from their ordinary routine to supply large orders for: —

Nickel-coated (rolled) mild steel sheet. (The Continental works paid 40 per cent. dividend.)

Gutter section mild steel for pit props (made in Germany by the 500,000 and now required in this country).

Electrical insulating materials, *e.g.*, ebonite, galalith, syrolit, &c.

Steel deep stampings for mining specialities. Glassware of every description.

The reply received is either indifference, or "We have never made these things before."

Fredk. J. Turquand.

London, W.C., *September 19th*, 1914.

British Firms and the Home Trade.

As a topical and interesting sidelight on the past—and, I fear, the present—failure of British firms to secure the Home trade, the following is worth noting:—

Fifteen days ago you were kind enough to insert in your "Trade Announcements" a request on my behalf that firms would send catalogues to a new branch I had opened.

The result was: Two catalogues of electric blowers, one each of hair brushes, oil engines, heavy switchgear, accumulators, heaters and fittings, and some pictures from a lamp firm to whom I had already given an order for that branch. A useful selection for a seaside contractor! It will be noticed that not one list was received from makers of wires, novelties, bells, telephones, or any lighting accessories, and none of the large general firms sent anything. Doubtless their travellers will call on their weary journeys, and then wonder why they are passed over, and why the orders go abroad.

In the same circumstances, a few years ago, I had a similar experience with British firms, but was bombarded with lists, letters, and visits from the agents of all sorts of Continental firms.

E. Arthur Pinto, A.M.I.E.E.

Hythe, *September 19th*, 1914.

Temporary Substitutes.

Seeing the great need for the younger men of the electrical engineering profession and industry to place themselves at the disposal of their country, and the opportunities which they would have of doing so, it behoves the older ones such as myself, who cannot go to the front, to offer ourselves to take the places so vacated temporarily.

I have offered my services through the Institution of Electrical Engineers to serve in any rank where such would be of value in erecting or running plant, but understand that so far very few vacancies have resulted through enlistment. If this be so, it is not what I should have expected, and it may be that many have the fear that their prospects would be prejudiced in the future; such fear might be removed if it were widely known that men like myself would only hold posts until those who enlisted were able to return to them.

Robert Ritchie, M.I.E.E.

Battle, *September 15th*, 1914.

Is "Earthing" an Extra?

Should a contractor make a charge as an "extra" for earthing, under the following conditions?:—

A contractor contracts to lay three-core armoured cable on premises with a three-phase 440-volt supply power load (at a price per yard run, "the work to be finished in a workmanlike manner"). Earth plate and copper strip up to the main switchboard are supplied, together with the generating plant, under another contract. The armouring and lead sheathing serve as an earth throughout. The plant to be connected to the earth-plate at the power house through the copper strip mentioned above. Taking the term "extra" as meaning work unforeseen at the time of tendering, and since earthing must of necessity be carried out on work of this nature to comply properly with the phrase "to be finished in a workmanlike manner," it seems evident that earthing is not unforeseen. Should earthing, therefore, be an extra?

Extra.

Arbitrary Action of a Public Authority.

Your anonymous contributor of last week has adopted a high-sounding patriotic title, but is cowardly enough to sneak behind such a *nom-de-plume*.

Nevertheless, he raises two points and associates me with them in a manner calling for reply.

I always have and still contend that, failing mutual agreement, the purchaser has an equal right to specify his own conditions in the same manner as the sellers are insisting upon theirs.

I have always been willing to support a standard set of general conditions when these are fair and equal to both sides, but I contend that the present conditions insisted upon by the sellers are grossly unfair to the purchaser.

I emphatically disagree with a statement as to conditions of contract which the I.E.E. consider fair.

The I.E.E. as a body have had no say in the matter; the conditions referred to were those which a select Committee of the I.E.E. passed, but although I made several attempts I was unable to find out the exact composition of the Committee, and I hold it was an act of injustice for this secret Committee to put forward such conditions as being the representative view of the Institution as a whole.

Like our expeditionary force, I have been fighting for liberty, but compelled to retreat for the time being on account of a stronger force, and not the justice of the battle.

Our First Lord of the Admiralty has, however, shown a way when he stated that the Government were not un-

mindful of the necessity of starting an armour-plate works to combat the ring, and he speedily followed this up by inducing the Government to invest and obtain a controlling interest in the oil supplies as a set-off against the existing monopolies.

I trust the manufacturers and sellers will take this to heart, and not endeavour to force their present advantage to the hilt.

Incidentally, I should mention that the "certain public body" is not the one I have the honour to serve.

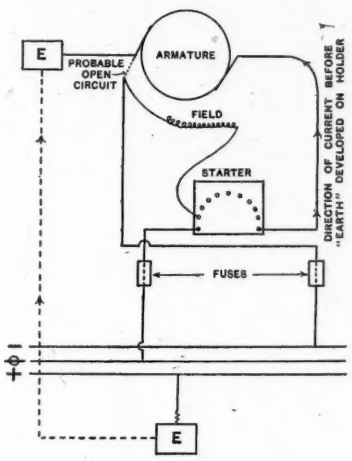
Fred. W. Purse,
City Electrical Engineer.

Carlisle, *September 21st*, 1914.

Strange Behaviour of a Motor.

Mr. Crauford's letter under the above heading in your current issue rather interested me, and presuming the motor in question is connected across the neutral and one of the outers of a three-wire distribution system, the seemingly strange behaviour of the motor may be explained in more than one way. I understand from Mr. Crauford that one side of the system was at "earth" potential temporarily. If this was so, and an open circuit existed between the main thereto and the "earthed" brush-holders, then the trouble may have been caused by a reversal of the armature current and an open field—probably this is what actually occurred, in any case it is one explanation.

Mr. Crauford does not state that there was an open circuit between the "earthed" holder and the field connection.



In fact, he does state that all the connections, &c., were O.K. I feel rather inclined, however, to doubt this. Assume, for instance, that the earthed brush-holder as shown in my sketch was negative and that the positive side of the section was also "earthed." It is clear then that the fuse on the negative pole must have been blown, or that an open circuit existed between the brush-holders and the negative main at the point of connection; it is probable that whoever afterwards carried out the isolating from "earth" of the brush-holders also made good the connection of the main thereto. The sketch of connections which I attach is a rough one, but will probably serve its purpose.

E. J. Walsh.

Kilmarnock Electricity Works,
September 19th, 1914.

Fire Alarm Successes.—Particulars of recent outbreaks of fire which were successfully announced direct to the fire stations by their apparatus, have been sent us by the Associated Fire Alarms, Ltd. The prompt notification enabled the fires to be extinguished before serious damage had been done. In view of the comparatively trifling cost of electric fire alarms, and the supreme importance of instant warning, it is difficult to understand why they are not universally installed in shops and warehouses, and other buildings containing valuable property

NEW ELECTRICAL DEVICES, FITTINGS AND PLANT.

New Electric Fires.

A new type of electric fire has been placed on the market by Messrs. Ingram & Kemp, Ltd., of 27, Hatton Garden, E.C., which possesses several features of interest.

Electrically it is made up of several heater units each converting about 500 watts of electrical energy into radiant heat.

The heater is a flat strip of suitable metal spirals held securely along every portion of their length in specially-formed insulators. The insulator bed in which spiral wire is run is of such a shape that it permits the whole of the red-hot spiral to show and itself becomes red hot, but it does not allow of very free circulation of air round the heater wire. In this way an intense red heat is produced which is nearly all radiant, very little of the heat coming away by convection.

The specially-shaped insulator bed is built up of a number of small pieces of heat-resisting material suitably mounted in a sheet

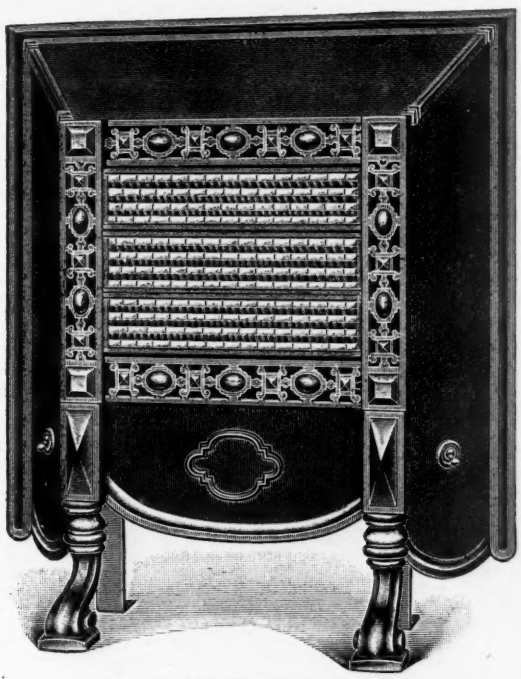


Fig. 1.—New Type Electric Fire.

steel tray which also carries the contact pins. This construction provides a neat, effective and almost unbreakable replacement heater unit. Special porcelain is used where the heat is intense.

The live wire spirals are securely held throughout the whole length without in any way putting mechanical strain on the wire; at the high temperature required for red heat, experience has shown that mechanical strain even of a slight nature cannot be sustained by a wire very long. The heater wire is sufficiently enclosed for it to have a uniform temperature throughout; this relieves the material of all internal strains due to uneven heating and materially lengthens the life of the wire. It is also confidently asserted that its life is enhanced by protection from a free air circulation.

Messrs. Ingram & Kemp also stock numerous high class electric lighting fittings in artistic designs, lamp radiators, &c., which, together with the fires, are on view at their Hatton Garden showrooms.

Arc Lamp Winch.

The London Electric Firm, of George Street, Croydon, have introduced a new arc lamp winch, made in two sizes for small and large lamps; it is of robust construction and is being placed on

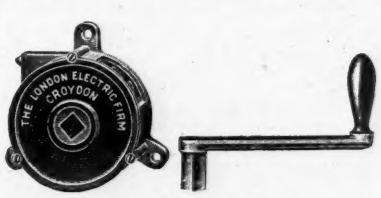


Fig. 2.—Arc Lamp Winch.

the market at a price which will remove the necessity of purchasing cheap foreign made winches. The firm carries large stocks of these winches, together with wire rope, pulleys, &c.

"Eclipse" Cooking Apparatus.

We reproduce herewith an excellent view of an "Eclipse" cooking apparatus installed at Derby, where it is used in connection with the dining-room of the board of directors at the Midland Railway Station.

The installation consists of an "Eclipse" electric hot-cupboard and carving table combined, which measures 60 in. × 33 in. × 30 in. deep, with internal dimensions of 56½ in. × 27 in. × 26½ in. deep. The hot-cupboard, constructed of cast-iron, is fitted with two shelves and two sliding doors, and the top plate, ground bright, is arranged for electric heating. Six switches and terminals are provided for connection to the 350-volt three-phase supply, the voltage between each phase and the neutral being 200. The power consumption of the cupboard (interior) is 3,500 watts (three approximately equal circuits), and of the top plate, 1,200 watts (three approximately equal circuits).

The "Eclipse" Bain Marie is of the best quality copper, pure tinned inside, and measures 24 in. × 18 in. × 5 in. water depth, and 9½ in. overall depth. It is complete with inside perforated

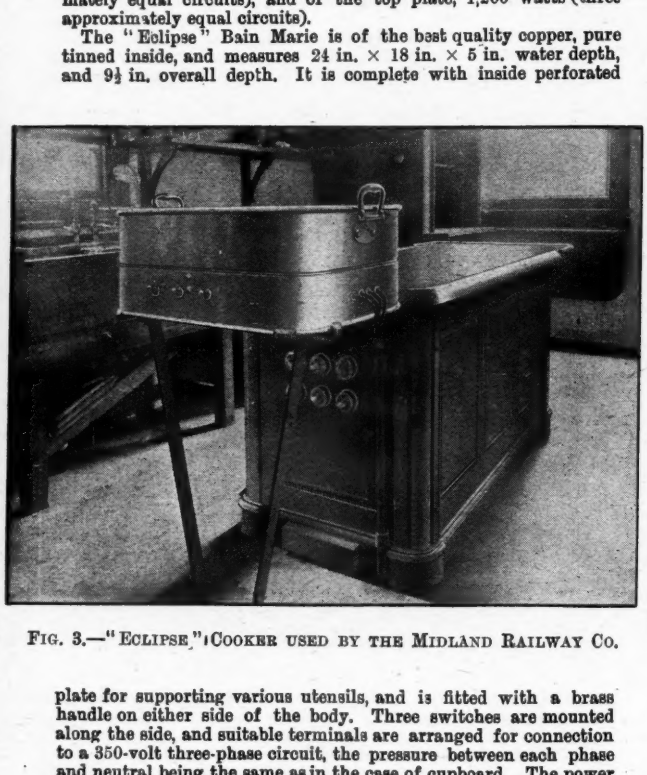


Fig. 3.—"Eclipse" Cooker used by the Midland Railway Co.

plate for supporting various utensils, and is fitted with a brass handle on either side of the body. Three switches are mounted along the side, and suitable terminals are arranged for connection to a 350-volt three-phase circuit, the pressure between each phase and neutral being the same as in the case of cupboard. The power consumption of the Bain Marie is approximately 4,500 watts. Three-pint "Eclipse" kettles are also used; these are of sheet copper, highly polished outside, and pure tinned inside.

The "Eclipse" grill and toaster included in the equipment, complete with drip pan, grid and toast grid, is made of sheet-steel, with stove black enamel finish. The external measurements of the grill are 9 in. × 10 in. × 10½ in. deep, the corresponding internal measurements being 6 in. × 8 in. × 8½ in. The weight of the grill is 8¼ lb. and the power consumption is 1,000 watts.

"Eclipse" electric heating and cooking apparatus will withstand as much rough handling as ordinary domestic utensils of a similar character, the heating elements are guaranteed to last, and all the apparatus is manufactured by the Electric and Ordnance Accessories Co., Ltd., of Aston, Birmingham.

OUR LEGAL QUERY COLUMN.

"Z" writes:—"A small electric light company, having its plant and most of its consumers in the village of X, has extended its operations on a small scale in the neighbouring village of Y. Overhead wiring is used, and in every case a consideration is paid for wayleave of the poles, &c. Some of the poles are on the public highway, and in every case, of course, wayleaves are being paid for these to the Urban District Council.

"Now, in addition to these wayleaves, the valuer to the Urban District Council of Y is assessing the company's poles and overhead wiring for rating purposes, that is to say, such of them as are within the boundary of Y. He has been informed by the company that wayleaves are being paid already, and that, therefore, they are not liable for further rating. The matter has not been allowed to rest, however, and the valuer is now pressing for information as to the income derived from the company's consumers in the village of Y. Will you please inform me whether the company is liable for any rates to the Urban District Council of Y, and whether, if it is liable, the company is under any obligation to supply the authorities with information as to the income or profit derived from consumers in Y?"

*** The mere fact that wayleaves are paid for the wires which are placed within the boundary of Y does not appear to affect the question whether that part of the undertaking which is in Y is rateable. It seems that the rating authorities are quite in order in seeking information as to the income derived from the company's consumers in Y. In Halsbury's "Laws of England," Vol. XXIV, p. 38, it is stated that "Undertakings for the supply of electrical power or light are valued, and their rateable value is apportioned among various parishes upon similar principles to those which are applied to gas undertakings." This is said to be the practice at Quarter Sessions, and it has not been challenged in the Superior Courts. The principle applicable to the rating of property of gas or companies is as follows:—Where the system extends into several parishes, the rateable value of the whole system is first ascertained, and is then apportioned among the several parishes into which the system extends. The principle of apportionment is based on the distinction between the two kinds of property into which (by a rough division) every system of gasworks or waterworks may be divided, viz. (1) the pipes which deliver gas or water to the consumers, and are thus directly productive of profit; and (2) the stations where the gas is manufactured, or water pumped up, and where gas or water is stored, and the carrying mains which convey the gas or water from one station to another, or from the stations to the parishes in which the gas or water is sold; the stations and carrying mains being in themselves unproductive, but indirectly productive of the profits earned by the other parts of the system. Applying this principle to electricity, wires and mains would be regarded as productive, while the generating station would be unproductive. The rateable value of the whole system being ascertained, the rateable value of the indirectly productive part is subtracted therefrom, and the residue is divided among the several parishes into which the directly productive part extends, in proportion to the gross or net receipts earned in those parishes.

WAR ITEMS.

The B.E.A.M.A. and "The State of War."

We have received the following communication:—

I am directed by my Council to transmit to you the accompanying copy of a circular letter, dated to-day, which has been sent to the members of this Association.

This circular is marked "Confidential," but having regard to the publicity given by the technical Press to the contents of a previous circular to members, dated the 5th inst., my Council will feel obliged by your giving publicity to the present one.

D. N. Dunlop,
Secretary, The British Electrical and Allied Manufacturers' Association.

London, W.C., *September 18th*, 1914.

[copy.]

Confidential. "The State of War."

Dear Sirs,—Since the resolutions proposed by the Council on the 4th inst. were circulated to members for consideration, the Government has issued a further proclamation dated September 9th making somewhat clearer the legal position relative to "Trading with the Enemy," and an Act of Parliament has been passed in support of it.

The proclamation states that in the case of incorporated bodies, enemy character attaches only to those incorporated in an enemy country.

Without attempting to define the legal effect of the proclamation or the Act of Parliament, the Council, in view of the foregoing, and of representations made to them, desire to state that the practical difference between companies which largely manufacture here, and those which are merely branches (whether incorporated in Great Britain or not) of concerns domiciled in an enemy country, justify the Council in modifying, in favour of the former companies, the proposed resolutions, and thus give effect to the dominant feeling of members that this distinction should govern their patriotic business policy.

D. N. Dunlop,
Secretary, British Electrical and Allied Manufacturers' Association.

London, W.C., *September 18th*, 1914.

What Constitutes a British Firm?

We have no desire to intervene precipitately in the correspondence on this subject, but it seems to us that an opportunity having been given for the discussion of the matter from practically every conceivable standpoint, it may now with advantage be considered closed. Correspondents whose letters merely contain reiteration of views already stated by others, or indulge in personalities or display a spirit of vindictiveness, will excuse us if in future space does not permit us to publish their remarks. The following are the principal letters received this week:—

I am afraid some of your correspondents have allowed their natural feelings of indignation at our having this dreadful war forced upon us to run away with their judgment. The matter seems to me very simple. As regards the selling agent of a German manufacturing firm there is nothing to argue about. He cannot introduce his goods any more, and must therefore cease business. The case of a manufacturing works established here, which has been built wholly or in part by German capital, is different, but I cannot really see what good it will do the

Germans if we go on using their capital if we don't pay them for it. It seems to me they suffer, not we. To put Englishmen out of work because they are working with capital owned by Germans, and for which the Germans are getting no return, seems to be a remarkably fantastic proposition. I am glad the Government have taken the commonsense view and arranged that, provided that no payments are made to Germany or Austria, such businesses may go on.

I should like to refer to another point, and that is that some of your correspondents seek to question the *bona fides* of naturalised Englishmen. I think this is unfair. These people have fulfilled the requirements of the law, and have taken the oath of allegiance to the King, and have been granted, under the signature of a British Minister, all the privileges of a British subject. An Englishman's word is his bond, and we must not assume, unless we have good evidence, that a naturalised fellow subject is both mad and a traitor at the same time. I say mad, because would any sane person, having once been an Englishman, wish to become a German again?

C. C. GARRARD.

Sutton Coldfield, *September 14th*, 1914.

In my letter, published in your issue of September 11th, I nailed to the counter a false coin put into circulation by Mr. Sydney Evershed. In your current issue the Langdon-Davies Motor Co. utter another; they state that I am "a director of the company." I am not and never have been.

In reply to their inquiry, the number of directors last elected corresponded exactly with the number of vacancies on the board.

I am attacked twice by trade rivals whose written word is falsehood; I am glad I am not buying from either.

Inquiry shows there is apparently only one mint for these false coins, for Mr. P. F. Brittain, in whose hand the last is found, claims elsewhere to be the "Representative of Evershed and Vignoles, Ltd.," and possesses the appropriate telegraphic address of "Purposeful."

JUSTUS ECK.

London, S.E., *September 21st*, 1914.

Your voluminous correspondence of last week, relative to associating Messrs. Siemens Bros. & Co., Ltd., with "The Enemy," has interested me considerably, and I rejoice to think, Sir, the answer is given in your own journal—always a recognised organ for fair and unbiased comments on matters of public interest—I read that this firm has sent no less than 723 of their employés to join the Colours, and is paying all married men full wages, and single men half wages, during their absence from business, fighting the enemy. Surely, Sir, the significance of this action proves unquestionably (if proof indeed be needed) that Messrs. Siemens Bros. & Co., Ltd., are doing what lies in their power as a loyal and patriotic firm to support *this* country in its hour of trial and anxiety. It is also well known to the writer that the company has done all in its power to stimulate recruiting for the National cause. I am confident that lovers of fair-play will concur with me in saying that this company (large employers of British labour) have, at least, done their part nobly and well.

If it were necessary for a company, as a guarantee of good faith, to prove they have always received the support of Government departments and municipal Corporations throughout the United Kingdom and Colonies, I question whether there are many other firms in this country who could bring forward such tangible and convincing evidence in support of such a claim as Messrs. Siemens Bros. Now, why is this true? Surely, for no other reason than that for very many years they have created a reputation for high-class workmanship and efficiency in all their productions, which result has been achieved by British labour. In dealing with this somewhat involved problem, let us try and be broad-minded. Our object will not be achieved by trying to stop foreign investors coming to this country, if, as in this particular case, they are providing the essential factor, viz., capital to create English labour. If the firm were depending on German labour it would be impossible for me to say a word in their favour, but I think I am correct in stating that practically all their employés are sound Britishers. I am, therefore, delighted—having no axe to grind—to say a word in favour of a company whose loyal treatment of their employés it would do well for many others to emulate. I am sure, Sir, a company who for years have had the respect of the most prominent engineers in this country, and whose name in the engineering and electrical world is so universally known, are entitled at least to the Englishman's version of justice and be considered "Innocents" until proved "Guilty," for the latter they can never be.

H. T. GEAR.

September 14th, 1914.

We, the undersigned, being representatives of organised workers employed by Messrs. Siemens Bros. Dynamo Works, Ltd., Stafford, desire to call public attention, through the columns of your esteemed paper, to a few facts concerning this company, which has lately been subject to malicious attacks from various sources; the same tending to damage the future trade of this old-established firm, founded about the year 1847 A.D. by Sir William Siemens, who was the pioneer of a new industry, which has since reached large dimensions.

At the outbreak of the present hostilities, many of our fellow British workers were called up for service, and the dependants of these men are being supported by the firm in such a manner that the fear of want has been dispelled; in many cases this help amounts to full wages allowance. This action on the part of the firm has lifted a deal of responsibility off the shoulders of the local distress committee

The works have been kept on full time up to the present in spite of many difficulties, and the management are doing their utmost to continue these acceptable conditions, while some British firms, in the face of the same inconveniences, have placed their men on short time.

Great encouragement has been given to the young men to enlist in the new army, and some hundreds have responded. All men who are serving King and country are having their situations kept open for them until the welcome time arrives when peace has once more been established throughout Europe, when every man will have the opportunity of returning to his work. The feelings of these men could be better imagined than described, if, on their return, after enduring the privations of warfare, they found the gate of their old firm closed, as the outcome of prejudice born of British patriotism.

The foregoing points show that Messrs. Siemens, although bearing a German name, have displayed more patriotism towards England than many firms who claim to be absolutely British. We also wish to state that in normal times about 2,000 workpeople are employed at these Stafford works, out of which approximately 4 per cent. are foreigners, comprising Germans who have grown grey in the service of the firm, others born in England, and a good number of other nationalities not alien enemies.

It has also been stated in reference to Siemens that Germany benefits to the extent of £35,000 annually in profits, without any corresponding advantage to this country; seeing that the company pay quite £100,000 per annum in wages at their Stafford works alone, is not this a decided counter-availing advantage?

Of course, Mr. Editor, we fully realise that during the period of this national crisis, when everything which is German in character is apt to rouse the wrath of Britishers, people are inclined to let their indignation gain the mastery over their powers of reason.

In conclusion, we would urge all Corporations and other public bodies to consider these facts before letting prejudice interfere with the welfare of the British workers.

F. Lees, Scientific Instrument Makers' Society.
L. Cooper, Brass Workers' Society.
H. H. Wickens, Iron Founders' Society.
E. Wainwright, Sheet Metal Workers' Society.
A. Spiers, United Patternmakers' Society.
R. Patterson, United Machine Workers' Society.
F. J. Gibson, Core Makers' Society.
A. Southall, Amalgamated Toolmakers' Society.
A. Frenzel, Amalgamated Engineers' Society.
T. Wood, Steam Engine Makers' Society.
H. Lovatt (President), United Patternmakers' Society.
F. Partridge (Hon. Sec.), Amalgamated Engineers' Society, 3, Sabine Street, Stafford.

I have no desire to add to the correspondence in your columns under "War Items," but I wish to correct a misstatement of fact made by "British Investors," in his letter concerning this company that appeared in your issue of the 18th inst.

It is a fact that this company has never, since its formation about 20 years ago, employed a single German or Austrian workman; further, neither the managing directors nor any members of the staff, with the exception of one correspondence clerk, are, or have been, German or Austrian.

I also take the opportunity of stating that all accumulators supplied by the company have always been made at its works at Dukinfield, near Manchester.

I trust you will be able to insert this correction in the next issue of your journal.

E. JACOB, *Managing Director*,
The Tudor Accumulator Co., Ltd.

London, S.W., *September 21st*, 1914.

I do not see why Mr. G. E. Kerss—not a very English surname by the way—should characterise as "a most unwarrantable and uncalled for insinuation" my friend Mr. Campbell Swinton's statement that he has sufficient respect for Mr. Alexander Siemens to believe that the latter "must retain considerable sympathy for the land of his birth."

Surely it is only right that Mr. Siemens should have such a feeling, for surely every man, however his legal status may have been altered by naturalisation, and however much he may condemn the acts of his former country, must continue to have some affection for the race from which he has sprung.

It would have been different had the allegation been that Mr. Siemens approved the present barbarous methods of his quondam compatriots, but neither Mr. Swinton nor anyone else has made such a suggestion, nor is anyone likely to do so.

In conclusion, may I confess that, like the eminent engineer that he has quoted, I, too, read Mr. Swinton's original letter with great pleasure.

As some of your readers may know, Mr. Swinton is a member of one of the very oldest historic Scottish families, so that it is quite appropriate in his case that the *Perfervidum ingenium Scotorum* should blaze out in time of stress.

JOHN E. GRAY.

London, *September 21st*, 1914.

Although I am of opinion that your columns should only be used for matters of public interest, since Mr. Höhne in his letter in your last issue touches upon a purely private matter, I feel it incumbent upon me to set him right upon one or two points.

England is not, as Mr. Höhne suggests, the country of my adoption.

I am a British-born subject.

D

My father was a Russian-born subject and a naturalised British subject.

Having no desire to perpetuate a German name, more particularly for the sake of my children, in 1906 I adopted the name under which I have since been known.

Commenting upon Mr. Höhne's remarks concerning the microscopic profits made by my company since the starting of their works, whilst I am not disposed to accept his invitation to publish these particulars, I may inform him that my company has each year paid a dividend which has been quite satisfactory to the shareholders, who, after all, are the only people concerned, and not Mr. Höhne, who has the bad taste to intrude upon a matter which is my private concern, and who makes reference to affairs of my company of which he is totally ignorant.

GUY BURNEY.

London, W, *September 22nd*, 1914.

ENEMY FACTORIES.

It appears to be the opinion of many who write on this subject, that factories established in Britain and owned by the enemy, are being run solely for the benefit of the enemy, in that the profits go to him. But this is far from representing facts. A factory, if it makes profits at all, makes gross profits and net profits. Out of the gross profits, or rather should be said, incomings, are paid the outgoings and the net profits. The outgoings comprise rates and taxes, which go to the upkeep of municipal and Imperial services, and they comprise wages which maintain labour, and labour pays rates and taxes also out of wages. The outgoings comprise also charges for carriage, and, further, the building of the factory constitutes a hostage to fortune. After all these payments comes the profit, and since the present enemy has robbed us in various ways, our Government is entitled to waylay the profits and prevent them from being sent to the enemy for such period as may be thought fit. There can be no reason in withholding orders from firms like Siemens or other German-owned undertakings, if the profits are duly retained until the day of settlement. Close down these enemy works, and thousands of men will be thrown out of work at the time when we are all being urged to capture enemy trade abroad. We are all of us horrified at the atrocities in Belgium which are the direct outcome of the poisonings of every German mind since, if not earlier than 1870, by the false prophets in whom the German people have put their trust. But there are prominent industrial leaders among us who seem to have been here long enough to have forgotten them or to be old enough not to have had the misfortune of being taught the false doctrine of blood and iron. Why harry such men at this juncture? They have not earned the Nemesis which appears to be about to fall upon Kaiserdom. For all my thinking lifetime of 44 years, this menace has been an overshadowing dark cloud, for I remember '64 and '66, and could reason on these two years when '70 burst on us with its Bazeilles and other atrocious wickednesses. And with excellent reasons to beware of Germany and her methods, I would not harry any amongst us of whom we feel that they are free from blame.

W. H. B.

BRITISH-MADE TELEPHONES.

The lengthy communication of Mr. H. S. Höhne appearing in your current issue, seems to me to call for more than casual remark.

I should like to query the statements (1) that no firm cataloguing telephones in this country can truthfully declare that every part of the instruments displayed in their catalogues is made in this country; and (2) that within the last two years a British battleship was fitted with foreign-made telephones, supplied by one of the British firms of oldest standing.

As far as my knowledge goes, there is one British firm, perhaps not a very large concern compared with gigantic companies Mr. Höhne has in mind, but essentially British, manufacturing special types of telephone apparatus standing in a class by themselves as representing originality in design and efficiency in service, which are made throughout (except perhaps for the carbon transmitter material) in England, and all supplies listed or handled by this firm are of British origin.

To refer to the battleship alleged to be fitted with foreign-made telephones. To the best of my belief, no battleship built for the British Navy has been fitted with foreign instruments, and during the last 20 years, only one vessel constructed in this country for a foreign government has been provided with other equipment, and I think I am right in saying that this has since been replaced, at any rate as regards the principal circuits, by the British and undoubtedly superior article.

I may add that I have, for the past 15 years, been connected with the all-British firm to which I refer, and I think you will agree there is no necessity to mention this firm by name.

ARTHUR W. COX.

Wimbledon Park, S.W., *September 18th*, 1914.

Dear Sirs,—I enclose copy of a circular letter, dated August 28th, from the British L. M. Ericsson Manufacturing Co. In the interests of fair-play I would ask you to be kind enough to publish this in your columns.

Messrs. Ericsson infer that all the telephones which they supply are British made; in fact, their letter is in the form of an appeal to the public to support British-made goods. The potential buyer would naturally gather that the whole of their goods are British made, whereas I am in a position to say that out of the 150 telephone instruments in their beautifully-illustrated catalogue, only a very small proportion are made in England; the balance probably come from Sweden.

Commenting upon Messrs. Ericsson's statement that telephone manufacturers in Great Brilain make a practice of merely assembling German-made parts, and selling them as "made in England," I can only say that so far as my company is concerned, ever since the establishment of the works in this country, all instruments sold by them as British made, are genuinely British-made goods. I am further in a position to definitely state that the value of the parts imported from Germany since 1909 has not amounted to £100 per annum.

In view of the foregoing facts, I hardly think Messrs. Ericsson are entitled to make sweeping statements of irregular trade practices which have no foundation.

A great deal has been written in the Press during the past few weeks with regard to war on German trade, and I agree that a very fine opportunity presents itself to the British manufacturer, but if by trying to throw dust in people's eyes, and mud at other telephone manufacturers in Great Britain, the Ericsson Co. imagine they will obtain the sympathy and the trade of the English buyer, I venture to suggest they will find they are vastly mistaken.

Having regard to the wording of Messrs. Ericsson's circular, I am curious to know whether they are prepared to point out to the trade which *are* the British-made telephones appearing in their current catalogue.

THE STERLING TELEPHONE AND ELECTRIC CO., LTD.
GUY BURNEY, *Managing Director*.

London, W., *September 22nd*, 1914.

[COPY.]

Dear Sir,—If you should be in the market for a telephone or for telephone material of any kind which you can absolutely guarantee to your clients as "British Made," we shall be glad to know of your requirements.

We definitely state that the whole of our British-made telephones and switchboards and parts are manufactured entirely at our factory at Beeston, Notts., and are not German-made parts merely assembled by us and then sold as "Made in England,"—a practice much too common.

Every 'phone made by us is of the same standard of workmanship and efficiency as those specially manufactured at our works for the Post Office, War Office, Admiralty, Crown Agents for the Colonies, leading railway and and shipping companies, &c., and are made by the same workmen in the same shops.

Send us your inquiries, no matter how small, and be assured that in manufacture of our British telephones British labour has been entirely used.

We shall be pleased to send you catalogues of leaflets upon application.

THE BRITISH L.M. ERICSSON MANUFACTURING CO., LTD.

London, W.C., *August 28th*, 1914.

L.B. & S.C. RAILWAY ELECTRIFICATION.

As a resident on the London, Brighton & South Coast Railway, one cannot help noticing that the operations connected with the further electrification of the line have been held up. It would be interesting to know whether this is due to shortage of labour in consequence of the war, or whether it is to enable the alien enemy manufacturers, who hold the contract for the plant, to complete their order when the war is finished. If such is the case, comment is needless. On the other hand, as an English undertaking, one would expect this railway company to cancel these contracts, and arrange for the work to be done in this country, in the way that other public bodies have done under these circumstances.

A BRITISH MANUFACTURER.

London, *September 16th*.

[We think our correspondent is mistaken, as we have seen cable hands actually at work within the past week on part of the line. —EDS. ELEC. REV.]

THE LAMP INDUSTRY.

The Corona Lamp Works are making distribution of a circular purporting to give information as to "Who's Who in the Lamp Industry." They are evidently doing this with the intention of suggesting that practically every lamp firm, except their own, is a foreign firm. To further this idea they give the names of directors of various firms, always being very careful to give only the foreign-sounding names, and, in certain instances, going to the length of altering the spelling to suggest German nationality. Their spirit of fairness, however, leads them totally to ignore the names of all directors, &c., who are obviously British.

Doubtless they hope to infer by this circular that they themselves manufacture their lamps in Great Britain.

Their action is strange in view of the fact that in May last a judgment was obtained against them regarding large quantities of lamps imported by them from the Continent! Peculiarly they do not, in their circular, make any reference to this fact, which I certainly think could not be ignored in any letter purporting to be giving advice and information to electric lamp purchasers.

ATLANTIC.

London, *September 22nd*, 1914.

REPORTS FROM MARKETS ABROAD.—SOUTH AFRICA.—The following information has been received from the office of His Majesty's Trade Commissioner in South Africa in a communication to the Board of Trade, dated August 17th:—

"The readiness on the part of the banks to meet the difficulties of existing conditions is equally shared by responsible merchants. The moral effect resulting from the steps taken by the Imperial Government to keep the African Ocean route free, and to remove financial difficulties, has been to restore confidence in South Africa to a wonderful degree. It would appear that in some respects, South Africa has had to rely on Germany and Austria for certain lines of commerce which are difficult to obtain elsewhere. Nevertheless, the country has awakened to the fact that something more than financial support to British industry is lost by dealing with foreign manufacturers, especially when its needs can, to a considerable extent, be satisfactorily supplied from one part or

other of the Empire. The opportunity will shortly be given to British manufacturers of capturing an immense portion of the trade in this market hitherto held by Germany and Austria, but it is highly necessary that they should not mark the disappearance of these competitors by relaxing past efforts to reframe their trade organisation upon the most modern standards."

ALGIERS.—H.M. Consul-General at Algiers has forwarded (August 26th) a statement showing the value of goods largely imported into Algeria in 1912 from Germany and Austria-Hungary, to the exclusion of British products. One of the principal classes of goods included in the statement is scientific instruments and apparatus. The statement does not include goods such as coal and machinery, which are imported in larger quantities from the United Kingdom than from the German Empire and Austria-Hungary. The statement may be inspected by United Kingdom manufacturers at the Commercial Intelligence Branch of the Board of Trade in London.

SPAIN.—H.M. Consul at Seville has furnished (August 28th) a list of goods, which are usually imported into Spain from Germany :—Machinery, rails, iron pipes, steel cables, tools, brassware, enamel ware, brass sheets, gas pipes, tin plates, electrical fittings, lubricating oil, paint and varnish, india-rubber goods, chinaware, chemicals.

PORTUGAL.—H.M. Consul at Oporto cables (September 11th) that amongst the most important classes of German goods imported into Portugal are chemical products, paints, hardware, iron, automobiles, locomotives and plant, and electrical machinery. H.M. Consul at Lisbon states in a telegraphic report dated September 12th that since the beginning of the war he has received inquiries from Portuguese firms for information as to British firms supplying electric fans. Amongst the goods which have hitherto been supplied entirely or partially by Germany are enamelled iron baths, name plates, railway carriages, locomotives and component parts, aluminium ware, telephones, shades and globes for gas lamps, and glassware. For lathes and drilling machines, agricultural machinery and implements, and electric lighting plant and fittings, it is considered that there will be a market in the future, but owing chiefly to the fact that there are large stocks of these articles on hand, no purchases are being made at present.

ITALY.—His Majesty's Consul at Milan reports that since the outbreak of the war he has received inquiries from Italian firms who have hitherto obtained the following classes of goods from Germany, but are now anxious to buy or import British products, viz. :—

Rolled and hammered iron and steel bars.
Rolled wire rods: rolled tool and file steel.
Cold rolled iron and steel for saws, clock springs, corset springs, steel pens, &c.
Hot and cold rolled iron and steel strips.
Tubes of steel, iron, brass, lead, &c.
Metals.
Ironmongery.
Tinplate, sheet iron, brass, copper, &c.
Zinc, nickel, &c.
Electrical material, including telephones.
Steel wire.
Pressed steel parts for automobiles.
Soft steel sheets for laminated cores.
Electrical machinery.
Steatite insulators, for sparking plugs.
Automobile accessories.
Aluminium leaf.
Iron.
Carbons for electric arc lamps.
Ball bearings.
Workmen's tools.
Hardware articles.
Enamelled wares.
Surgical appliances.
Rubber.
Cinematograph materials.

BREST.—His Majesty's Consul at Brest reports (Sept. 7th) as the result of inquiries which he has instituted in his district with a view to obtaining information likely to be of use to British firms desirous of extending their trade at the expense of their German rivals, that in most cases the relatively high prices of British goods militate against their ready sale in Brest and district. British goods, though of high quality, are beyond the spending capacity of purchasers, who prefer, and, indeed, are often financially compelled, to buy twice and cheap, rather than once and dear. Surprise is expressed that British manufacturers, while maintaining their reputation for high quality goods, do not also make a bid for the custom of those to whom high quality combined with high price does not appeal. Complaint is also made that catalogues and price lists are usually in English, and deal in English coinage, weights and measurements, whereas German firms quote simplified and inclusive rates in French money, combined with metric figures of weight and size.

His Majesty's Consul further states there is a French firm at Brest, whose name and address can be obtained on application to the Commercial Intelligence Branch of the Board of Trade, which has a practical monopoly of the sale of all metal goods, and is a centre of distribution for all Finistere. The manager of this firm has expressed a desire to receive from England price lists and catalogues which he can readily understand. Stress is laid on the importance of quoting to Brest merchants strictly inclusive prices, so that customers may know the exact cost of goods delivered at their warehouses; strict attention to this point on the part of German firms has in a large measure contributed to their success in Brest and district. Porcelain and earthenware goods are obtained largely from Saxony through commission agents holding stocks in Paris. Lists of names and addresses of German and Austrian firms and of representatives of German firms in Paris with whom Brest merchants have done business may be seen at the Commercial Intelligence Branch.

RIO DE JANEIRO.—In a communication dated August 25th, His Majesty's Consul-General at Rio de Janeiro reports that it is obvious that the present condition of affairs affords British firms an excellent opportunity of securing much of the business hitherto handled by German houses in that city. The numerous German import firms there are absolutely debarred from receiving goods of any kind from Germany, and they can only rely upon such stocks as they happen to have on hand. They are quite unable to execute any orders for German goods.

Amongst the principal articles of German import in Rio de Janeiro have been iron and steel for constructional purposes, locomotives and machinery of various kinds, gas engines, electrical plant and fittings of every description.

Furthermore, it is to be noted that certain German firms in Rio de Janeiro have been doing big and lucrative business in connection with hydro-electrical installations. Indeed, there is hardly any branch of trade with which German firms are not largely connected. His Majesty's Consul-General emphasises the futility of attempting to build up a lucrative trade by means of correspondence only. It is the personal factor that counts in Brazil, and British firms desiring to capture trade hitherto handled by German firms, must make up their minds to send out alert and competent travellers possessed of a good knowledge of Portuguese, and of the requisite technical knowledge to enable them to deal promptly and authoritatively with their respective lines of business. These representatives should study the local conditions and requirements, and they should make it their business to satisfy such conditions and requirements. As regards the likelihood of British firms being able to secure regular payments from local firms with whom they might elect to do business, his Majesty's Consul-General states that this is a matter calling for the exercise of much judgment in the selection of the firms to be dealt with. Many firms are in a very precarious condition at the present time. Much of the success achieved by German firms has been due to the long term of credit allowed to local firms; and British firms desirous of securing German trade must be prepared to allow local firms a like measure of consideration. We refer to this matter somewhat fully in our leading columns to-day.

His Majesty's Consul at St. Paul de Loanda cables (September 18th) that amongst the goods of German manufacture which have hitherto been imported into Angola, but which might now be replaced by British products, are the following :—Locomotives; railway material; telegraph material.

BOARD OF TRADE ASSISTANCE.—The Board of Trade have received a very large number of inquiries for names of sellers or buyers of articles of which the sources of supply or markets have been interfered with by the war. Special arrangements have been made in the Commercial Intelligence Branch for dealing with the inquiries, and lists are being prepared and circulated of articles which inquirers desire (*a*) to purchase and (*b*) to sell. The first list was published on August 29th; the second list is now ready, and may be obtained on application to the Branch. Firms interested in any of the goods mentioned, either as buyers or sellers, should communicate with the Director of the Branch.

The last issue to hand of the Board of Trade series on different trades gives particulars of German and Austro-Hungarian exports of iron or steel bars, rods, angles, shapes, or sections, and information relating to the markets in which they are sold.

Other pamphlets of the series relate to motor-cycles and motor-cars and parts thereof.

CONTRACTS IN WAR TIME.

In the House of Commons on 16th inst., Sir J. Simon, in the course of a reply to a question by Mr. Joynson Hicks respecting contracts with alien enemies, said (according to the *Daily Telegraph* report) :—

It was quite true that there was a good deal of doubt and uncertainty in the minds of many persons in the commercial world as to how the outbreak of war had affected their rights and liabilities in contracts entered into before the war began. He did not mean the case of a man who wished he had not entered into a contract because prices and freights were rising. Everybody agreed that he must stand by his bargain, unless he could persuade the other party to come to his assistance. He meant the case where one party to the contract was a subject of our own, and the other was an enemy in the sense that he resided and carried on business in the enemy's country. Such a man said, "We have made our contracts in times of peace, and the performance is not yet completed; perhaps the time for performance has not yet come. How does the outbreak of war affect the performance of that contract?" The Government had been considering whether or not they could usefully and properly intervene to solve these difficulties. The real difficulty, which could not be got over by some formula or abstract statement, arose from the complexity of each individual case. He felt no hesitation in laying down, and he did not think any lawyer would deny, or any sensible man would question, this proposition, that if a party entered into a contract before the war began it was a lawful contract to enter into, and if the time to perform it had not come when war broke out, then, if performing the contract during the war was unlawful, no man was liable in the courts of this country because he did not perform it. That proposition was plain. The real difficulty was not in laying down such a proposition, but in applying it, owing to the large and infinite complexities of hundreds of thousands of cases. Although he had seen but a fraction of the difficulties, he had seen enough to know that it was not possible for him to lay down in advance a series of elaborate and particular rules that would govern these cases. Therefore, there was no alternative, except for those who felt any doubt in these matters to take the best advice they could.

GERMAN TRADE AND GERMAN VANDALISM.

Much is appearing in the technical and lay press on the subject of Great Britain obtaining some of Germany's foreign trade. We shall not get it all, America will see to that! The world, too, has been scandalised at the wanton destruction by the Germans of property having no military value, and a good deal of such property is irreplaceable even regardless of cost, *e.g.*, cathedrals and other old buildings, many works of art, books, MSS., &c. It is out

of the question for the Allies to lower themselves to the standard of German "culture" and to retaliate when they are in Germany, by destroying similar property, but why not retaliate, and at the same time assist the capturing of German trade, either by destroying German factories (especially Krupp's) or by confiscating all the plant in them? If this be not done, these factories will soon be at work again after the war, and the Germans will "cut" prices more than ever in order to recover their trade. Even 15 per cent. less in the price of an article will, a year or two after the war is over, unfortunately cover a lot of patriotism! Mr. Maurice Maeterlinck urges us to decide such matters *now*, while the horrors of the war are with us, and not to wait till it is over when sentimentalists, even in this country, will begin to plead for "the poor Germans" who are now committing, in addition to the above, diabolical deeds on human beings.

A. S. E. Ackermann.

London, S.W., *September 21st*, 1914.

P.S.—On account of my name perhaps I had better add that my family came to England in the 18th century!

The Future of Russia.—In an editorial on "Russia and the War," the *Financial Times* says:—"We may hope that one of the results of the present war will be a much closer association commercially and socially between ourselves and the Slavonic nations. Hitherto the economic development of Russia, and Roumania as well, has been largely directed from Germany, very much to the profit of the latter. The exports of Germany to Russia amount to about £60,000,000 annually, and the bulk of this consists of goods which can be easily supplied by English manufacturers provided the exact requirements of the trade are understood. It is certain that German merchants will be at a hopeless disadvantage in Russia for many years to come, and British and American manufacturers will be invited to supply their place. Moreover, should the war go favourably, it is probable that an immense impetus will be given to Russian trade in every department. . . . A message from the Petrograd correspondent of the *Times* points out, however, to take full advantage of the situation it will be necessary for our merchants to act promptly and not to wait until the termination of the war."

All-British.—The Klein Engineering Co. (1908), Ltd., wish it to be known that they are entirely British in every respect—capital, directors, shareholders, staff and workmen, and have no connection whatever with any foreign country. Everyone connected with the business is British born. The company does not work any foreign patents, and all its manufactures are made throughout in England. The directors are also the directors of Entwistle & Gass, Ltd., Atlas Foundry, Bolton.

Messrs. Scholey & Co., Ltd., write as follows:—"We had hardly thought it necessary to proclaim the fact that we were a British organisation in every sense of the word, but in some circles there is a misconception or a misrepresentation of our position. May we, therefore, say that 'Scholey' is an old English name, and is one of the oldest family names in Yorkshire; moreover, we might add that we have neither on our board nor on our staff anyone who is, or ever was, associated in the remotest degree with German or Austrian families."

As it might be thought that the firm of Messrs. Isenthal & Co., of Neasden, had some connection with Germany, we are pleased to be able to say that Mr. A. W. Isenthal, who is the sole partner in the firm, has been resident in this country for 25 years, and is a naturalised British subject. The business is carried on without any outside financial assistance, British or foreign, and the whole of the workmen and works staff are British-born subjects. The foreign patents which the firm is exploiting at present are of Swiss origin. The company has kept the works going so far with full time and the full complement of men, and hopes to continue to do so.

Contraband of War.—Additional articles to be treated as contraband of war in accordance with previous proclamations, are copper, unwrought; lead, pig, sheet, or pipe; and rubber.

Canada.—The Montreal correspondent of the *Times* says, under date September 14th: "Conditions in Europe are making it difficult for the larger industrial companies to secure new business. This is affecting iron and steel companies to the greatest extent."

Argentine Contracts Placed in England.—According to the *Times* a contract for a large number of passenger carriages for the new electrified services round Buenos Ayres of the Central Argentine Railway Co., originally placed with the Hannoversche Wagonfabrik, has now been awarded to the Metropolitan Amalgamated Railway Carriage and Finance Co., Ltd., of Birmingham.

Willans & Robinson, Ltd.—Within a few weeks of war being declared, over 20 per cent. of the total male office and works staff, irrespective of age, joined the Services, a record the firm has every reason to be proud of. Lord Kitchener has conveyed in a letter to the firm his special thanks. Places are being kept open, and half-pay rates paid for those who joined in that period. The company have always maintained a close connection with the Army, and contributed largely to the formation and support of a Howitzer Battery formed some years ago, whose headquarters adjoin the works. The company have in hand several orders for war material, and have acquired a special interest in aeroplane engine work, the company having secured, prior to the war period, the sole British manufacturing rights for the well-known "Salmson" engine (Canton-Unné system).

Chloride Recruits.—With reference to the paragraph given in our last issue, since this was written a good many more of the men of the Chloride Electrical Storage Co., Ltd., have enlisted. 20 men from the staff and works were called up on mobilisation, most of them being reservists, and several of these are now with the Army in France. Subsequently 53 have joined Lord Kitchener's Second Army, making a total of 73 men altogether. The company is making a weekly payment in the case of married men, or those having dependants on them. A weekly contribution from the works and staff to the Relief Fund is amounting to between £11 and £12.

Active Service Allowances.—The Mexborough and Swinton Tramways Committee have decided to pay a weekly sum of 7s. 6d. to the dependants of workmen in their employ who are on active service.

The Luton Electricity Committee have decided to pay each of their employés who have been called up for military service, his ordinary wage less the sum received from the War Office.

Messrs. A. M. Mulliner, W. Tomlinson, J. Eyre and J. Gegan, of the Eccles Electricity Department, having joined the Colours, the Corporation has decided to make up the difference between the army allowance and their salaries.

Relief Funds.—The Yorkshire Electric Power Co., of Dewsbury, have contributed the sum of £250 to the West Riding Distress Committee Fund, which is being raised by Sir John C. Horsfall, Bart., chairman of the West Riding County Council.

Trade with Belgium.—A correspondent at Ghent (M. Emile Pauwaert), who says that there is a broad field of action in Belgium for almost any British industry to replace German goods, wants to hear from British manufacturers.

Laurence, Scott & Co., Ltd.—About 140 employés of this firm have joined the forces. Wives and dependants are being assisted. The directors have promised £50 toward a fund that is being prepared by the staff and employés for the relief of distress, &c.

Salford Contracts.—The Salford T.C. has adopted the recommendation relating to contracts, to which reference was made in this column last week, to the effect that all contracts entered into with the Corporation be adhered to, with the exception of such contracts, or parts thereof as involve trading with alien enemies. An addition was made to the resolution which will allow any committee which desires to submit circumstances in support of any exception to the rule laid down to have its views placed before the Council.

Employes at the Front.—About 50 members of the staff of the Endolithic Manufacturing Co., Ltd., including several travellers, have enlisted. All places are being kept open. The company will not raise prices so long as the stock lasts, but if the war is of long duration, raw material from the Continent being unobtainable, they must eventually advance.

The Peel Green Engineering Works, near Eccles, are busy on an order from the War Office for searchlight plant. Sixty employés of the firm have joined the forces, and provision is being made for their dependants.

Messrs. W. Canning & Co., of Birmingham, ask that as 48 of their staff, foremen and workpeople are with H.M. forces, indulgence should be shown if there is a temporary falling off in their usual services. They have issued a general circular reviewing business conditions which they report to be steadier than when they issued their circular of August 13th.

Manchester Tramwaymen.—It was stated on Tuesday that the Manchester Tramways Committee was paying no less than £400 per week in wages to the wives of dependants of men who have joined the Colours. Men are joining Lord Kitchener's army daily, and already 720 men have left for service in connection therewith. The business of the tramways parcels department has fallen off by about 25 per cent. during the last few weeks.

Controlling Devices.—The Igranic Electric Co., Ltd., of Bedford, inform us that they are making every effort to carry on business as usual, though many of their employés are with the Colours. They obtain almost all their supplies from British sources, and carry a very large stock of finished articles. While they have had to withdraw outstanding quotations of special terms, they hope to be able to accept orders at the prices already quoted.

British-Made Labels.—The Endolithic Manufacturing Co., Ltd., of 61½, Fore Street, E.C., inform us that all their labels are British-made, and the whole of the capital of the company is held by British subjects.

Our Opportunity in Belgium.—Messrs. Bugg & Co., of 23, Rue du Brésil, Antwerp, electrical importers, write to inform our readers that owing to the cessation of sale of German goods in Belgium, there will be a great demand for British. The firm will be pleased to hear from British suppliers of armature stampings, brush-holders, carbon brushes, dynamo wires, cables, &c., with a view to representation.

The Bradford 5,000-kw. Plant Contract.—The British Westinghouse Electric and Manufacturing Co., Ltd., write as follows:—"As there seems to be a general impression that this company accepted the order for this set from the Bradford Corporation at an extremely low figure, we should like to state that, not only was our original tender price higher than that at which the contract was placed for the Bergmann set, but also that the price at which we have now accepted the order is higher than our original tender price, owing to the increase in the cost of raw material, which has taken place in the meantime."

Siemens and the Prince of Wales's Fund.—The sum of £460, contributed by the employés of Messrs. Siemens Brothers and Co. at their Woolwich works, has been handed over to the Mayor of Woolwich for forwarding to the Prince of Wales's Fund.

NEW RADIO-TELEPHONY SYSTEMS.

The radio-telephone systems devised by the Italians Marzi, father and son—the former for some years Director of the Rome telephones—and the French officers Jeance and Colin have lately given very satisfactory results during trials on the Continent. Experiments with the Marzi system were made from the Goldschmidt station at Laeken* (Brussels), messages emitted being received at Antwerp, Sain, Trond, Luttich, Bostonge, Namur, Tournai, Ghent, Coutrai, Bruges and other places. Finally very successful trials were made between Brussels and the Eiffel Tower, an orchestral and vocal concert being satisfactorily reproduced, despite unfavourable atmospheric condition, when using 1½ amps. primary microphone current and 3 amps, secondary microphone and aerial current in the Brussels station. Successful radio-telephony requires the use of a generator of high frequency and very uniform oscillations and a microphone capable of imposing on such a current oscillations corresponding to those of speech waves. A suitable generator is obtainable without much difficulty, but a microphone constitutes the most serious stumbling block in any system of wireless telephony yet devised. With all ordinary forms of carbon microphones the trouble is that the granules overheat and become covered with an insulating sheath, unless the working current is so weak that it does not suffice to control adequately the aerial current. Numerous attempts have been made to cool the carbon by metal or other heat conductors, air or water currents and so on, but in the Marzi microphone a new principle is employed. Instead of a stationary carbon contact, a moving contact is established by a stream of carbon granules, each of which remains in circuit too short a time to be injuriously heated. The Marzi microphone resembles the liquid microphones of Chichester Bell and Majorana in respect of continuous substitution or renewal of contact, but is distinguished from these types in that contact is restricted to the points of contact of the granules with a membrane instead of being distributed over a comparatively great length of the latter; the microphone effect is therefore greater and sharper than in hydraulic microphones.

Referring to A, fig. 1, a horizontal lever 2, 3 plays between the poles of electromagnets 1, 1 and carries a sphere 7 the upper half of which is platinised and lies within a platinised cup, mounted on the bottom of a cylinder 5. From the latter, fine carbon granules flow between the surfaces 9, 9 into a receptacle 10 when the magnets 1, 1 cause 2, 3 to oscillate in sympathy with speech or other sound vibrations. At other times the surfaces 9, 9 are held together and no granule flow takes place. When the apparatus is in use, the resistance between 9, 9 varies in proportion to the speech currents. Each granule is in circuit between 9, 9 too short a time to be heated appreciably, hence the carbon can be returned to 5 for indefinitely repeated use.

B and C represent alternative arrangements for the variable carbon-flow gap, and D shows the circuit connections employed. Speech or other sounds to be transmitted are directed into an ordinary microphone 16, connected in series with a switch 19, battery 17 and a primary coil 20 of a transformer, the secondary winding 21 of which is connected to the electromagnet 1 of the heavy current microphone already described and now represented by the pivoted lever 2, 3 and the variable-gap contacts 23, 24. The transmitting oscillating circuit is connected across 23, 24, a modification of the Moretti arc being used as the source of energy. Each arc is established by 600 volts p.d. between two metal electrodes, one of which is kept in continuous rotation. A frequency of 120,000 oscillations per second is obtained and a single arc suffices for distances up to 200 miles. With four arcs in series on a 2,400 volt supply, satisfactory communication has been established between the Italian arsenal at Spezia and Messina (520 miles). The apparatus is very compact and light (height 18 in., weight 9 lb.).

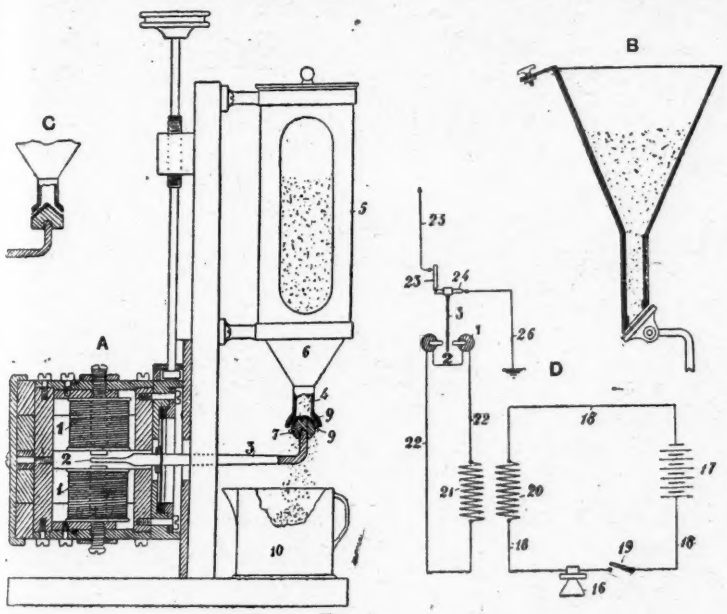


Fig. 1.

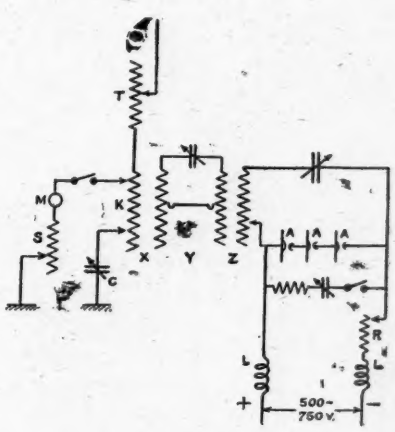


Fig. 2.

For reception, a very sensitive crystal detector with regulable condenser in the aerial and telephone circuits is said to be best. There follow in order of efficacy de Forest's audion valve, Fleming's valve (working at 4 volts from a battery of three accumulators with regulating resistance), and carborundum and electrolytic detectors.

The French officers Jeance and Colin also employ arcs to produce the high-frequency fundamental current on which speech variations are imposed. These investigators have devoted special attention to the problem of eliminating disturbances due to variations in the arc current. In the latest modifications of their system, the arc current is "filtered" free from all amplitudes and frequencies outside prescribed limits, leaving in the aerial a sinusoidal current of constant frequency and amplitude.

*This station was destroyed by the Belgians prior to the German occupation of Brussels.

At the sending station three arcs, A, fig. 2, are used in series, each burning between a copper disc anode and a carbon rod cathode. The arc burns in an atmosphere of acetylene and hydrogen (produced simultaneously in a calcium carbide and hydride generator) which prevents combustion of the carbon electrode or even adds slightly to its length. The copper electrode forms the bottom of a paraffin-filled water-cooled cylinder, and such slight arc adjustments as are required from time to time are made by hand. By varying the d.c. supply pressure between 500 and 750 volts, the arc current is varied from 3½ to 4½ amps. Direct current is fed through choke coils LL and a variable resistance R to three parallel circuits, across the centre one of which (the arc circuit) there is available 250-350 volts. On changing over from sending to receiving the pressure is reduced to 150 volts and a resistance automatically switched in current. The main oscillating circuit X, comprising a variable condenser and inductance, is coupled by an intermediate tuning circuit Y to the antenna circuit Z. The intermediate circuit Y prevents transmission of foreign frequencies to the aerial circuit which comprises a coupling coil K, regulable condenser C and inductance T. Across K and C are connected a variable inductance and the microphones in series, all spoken into at once by aid of a megaphone. This method of connecting the microphones eliminates sparking and places no limit on the microphone current. One of the two duplicate microphone sets cools while the other is in use. Regulable air condensers make possible most accurate tuning, this being very sharp owing to the purity of the transmitting aerial oscillations. The wave length can be varied within wide limits. Experiments carried out with 985 metre waves between Paris and various amateur and portable installations in the vicinity (distances up to 150 miles) show the Jeance-Colin apparatus to be simple and satisfactory in use.

REVIEWS.

Motoring: An Introduction to the Car and the Art of Driving It. By Algernon E. Berriman. London: Methuen & Co., Ltd. Price 10/6 net.

The motor vehicle has now become so much a part and parcel of daily life that there is a tendency, in some quarters, to regard motoring as a pastime as a diminishing quantity. Although this is undoubtedly true to an extent, in so far that many of the themselves, yet there is an unceasing flow of new to be driven as passengers rather than take the wheel themselves, yet there is an unceasing flow of new recruits to the ranks of motorists who find considerable pleasure, and even health, in the outdoor life that the possession of a car affords. Indeed, the light car, to which increasing attention is now being devoted, would appear to have given quite a new impetus to the movement in this direction.

It is probably due to this fact that there is a steady demand for books relating to motoring and the motor car, and, the demand existing, there is, as usual, no lack in the supply. The latest book on the subject is that by Mr. Berriman, who, from his long association with the movement, is in an excellent position to undertake such a work. In the course of fourteen chapters, the author deals with all the varied matters associated with the construction and operation of a motor car, the text having been written in the interests of the non-technical motorist. On the whole, the reading matter is clear, so that a careful perusal of the chapters devoted to the mechanism, and a study of the numerous detailed illustrations, should result in a prospective or novice motorist gaining a good idea of the why and wherefore of the various components of a petrol car—for it is to this type of automobile that the book is exclusively devoted. In a few cases, the author is, perhaps, not so lucid as might be desired, as witness his statement that the frame of the car is attached by springs to its road wheels.

A comprehensive chapter is devoted to the magneto now universally used for ignition purposes, while another deals with the dynamo which is now being increasingly employed for car lighting. A good deal of space is devoted to sound advice on the choice and upkeep of a car, although we have one or two small criticisms to make of this section. First, the question of tires, which is generally admitted to be one of the biggest items in motoring costs, is very scantily dealt with, not more than thirty lines being allotted to their description and consideration. Secondly, in figuring out the annual cost of motoring, only the outlay for tires and petrol is taken into account, these figures being used to make a comparison with the cost of railway travel. Needless to say, there are many other charges, such as the annual motor tax, insurance, cost of garage, lubricants, repairs, and depreciation allowance, which have all to be taken into account, and which will greatly increase the author's estimate of 2¼d. per mile.

The important subject of driving receives adequate treatment, and if the author's suggestions were generally adopted, it is safe to state that drivers would not only reduce the danger to the public but would at times find motoring a less worry-causing occupation. The question of petrol and other motor fuels is also discussed, but we are somewhat afraid that the text is of too technical a character to either be followed by or be of interest to the average motorist, a remark which also applies to some of the tables, such as those of sines and tangents, logarithms, and hydrocarbon formulæ, that are included in the appendix.

While we do not wish to convey an unfavourable impression of the book, which undoubtedly contains a vast amount of useful and reliable information, somehow or other, we cannot help feeling that it does not altogether fulfil the requirements of a *popular* work on the subject. It may be that we have not quite fully realised the object the author had in view, but in our opinion, there is rather too technical a flavour in some of the chapters, while, on the other hand, various matters of vital interest to motorists, from the motoring point of view—and that, we take it, is the main object, especially in view of the title of the book—could have been more liberally dealt with. It is frequently stated that criticism is usually destructive and seldom constructive, and, to avoid our remarks being put under the first-named classification, we would suggest the omission, in a subsequent edition, of some of the technical matter mentioned and a more liberal treatment of the question of tyres, and the water circulation of the engine, the latter to include an explanation of the two systems in use on present-day cars, and the functions of the radiator, the radiator fan, and, where used, the circulating pump.

Elementary Graphic Statics. By John T. Wight, A.M.I.Mech.E. London: Whittaker & Co. Price 4/- net.

In none of the higher branches of engineering can mathematics be avoided. But they can be either simple or complex, according to the way the problem is tackled. Thus many a calculation which might be supposed to require the use of the differential calculus can be solved with an accuracy to within one per cent. by means of graphical representation of the forces at work. Just how problems in statics can be dealt with on these lines is well described, with the aid of 135 illustrations, in this useful little book by Mr. Wight, who is Lecturer in Machine Design and Prime Movers in Heriot-Watt College, Edinburgh. All kinds of structural engineering work are touched upon involving beams,

girders, roofs, cranes, retaining walls; and many simple practical problems are worked out in detail all by means of the excellent science of graphics which, as the author says, "presents a ready means of circumventing the many intricate and cumbrous mathematical equations which can, all too easily, clothe comparatively simple problems with an air of mystery and difficulty." Undoubtedly there are mathematically-minded people who profess to scoff at graphical methods, but we know that every day of their lives there are numerous practical engineers who are satisfactorily carrying out big engineering works that have been admirably worked out by graphical means.

The Inventors' and Patentees' Year Book for 1914. By William H. Taylor. Manchester: The Dexter Press, Ltd. Price 7/6 net.

This is the first issue of what is really a very useful book. It is stated that future annual editions will keep the subject matter up-to-date, and enable new aspects of the subject to be dealt with. The subject matter is Patents and Trade Marks, and a perusal of its pages certainly leaves a clear impression on the mind as to what is a proper subject for a patent, how to proceed in getting the patent, and perhaps more important still, how to set about disposing of the patent. Mr. W. H. Taylor, the author, has had nearly thirty years' experience in patent office work, and acts as adviser to a number of important Northern industrial firms. He has placed his knowledge at the disposal of the readers of the book and given in succinct form the necessary information. In dealing with the question as to what may form the subject matter of a patent he quotes extracts from a number of legal decisions to illustrate his various points. The subject is such a wide one that it is not possible to deal seriatim with the various chapters. The author gives it as his opinion that in ordinary cases a total fee of £3 3s. should be sufficient to cover all charges for a provisional specification, and a further charge of £9 or £10 for the work and charges necessary on completing the patent. As is well known, there are no further fees till the end of the fourth year, when £5 is payable. A year later £6 is due, and so on to the end of the thirteenth year, when £14 is charged, the total renewal Government fees—exclusive of those paid on completing the patent—being £95.

There is much valuable advice on the way in which a specification should be drafted, and how it ought to be construed.

Sections of the book deal with the amendment of patents, their restoration, the reissue of duplicate letters patent in the event of the originals being lost, the procedure followed by the War Office and Admiralty for the issue of secret patents, the question of licences, patent registers, revocation of patent by Comptroller and infringement of patents. In each case much useful information is given in such clear language that the average reader can form a tolerably safe opinion as to when it is advisable for him to obtain expert advice.

The section dealing with "How to Market an Invention" contains a good deal of advice as to what to do, and much more on what not to do, this latter part being probably the most valuable.

An interesting account of the development of the Patent Office is given; there are full details as to the places in the country where Patent Office papers can be examined, and a list of patent publications.

This is followed by particulars as to foreign patents, how to set to work to get them, what they cost, and the conditions under which they are issued. In view of the war and the consequent chaotic condition of the European political and commercial relations, this part of the book is naturally more historical than applicable to present-day conditions.

The book contains 739 pages, and should be consulted by anyone in doubt as to how to proceed in procuring or dealing with patents. It is the pioneer year book relating to patents, and we have no doubt that as successive editions are issued, it will consolidate its position as the standard text-book on patent office work.

MARBLE AS MATERIAL FOR LAMP GLOBES.

It is well-known that thin sheets of marble are transparent, and, if suitably selected, of rare beauty. For window and other transparencies, Dr. A. Pfaff has mounted sheets of marble 0·1 to 0·5 mm. in thickness and up to 90 × 50 cm. in area between supporting sheets of glass, but the cost of production by this system is prohibitive. The practical application of marble, as a substitute for opal glass in the manufacture of diffusing globes for lamps, dates from the discovery, by H. W. Engel, of special grinding and impregnating processes whereby marble sheets from 3 to 20 mm. ($\frac{1}{8}$ to $\frac{13}{16}$ in.) in thickness may be made more translucent than the thicknesses of opal glass generally employed. After grinding on both sides, the marble is impregnated with various oils under high pressure and at high temperature; glass supporting sheets are no longer required, and the colour effects are much richer in the thicker sheets. The new material appears to be applicable to lighting fittings for all purposes, and particularly for decorative, advertising and electric sign work. The optical properties of white Engel-marble are described in detail by W. Voege in a recent issue of the *Electrotechnische Zeitschrift*, with special reference to its diffusing properties and its transparency to visible, ultra-violet and infra-red rays.

Comparisons were made between two 3·5-mm. marble plates (brightly polished in front but matt on the back surface); opal glass plates 1·8 mm. thick, matt on both sides and 3 mm. thick, polished on both sides; a 3-mm. frosted glass plate, and a 5-mm. clear sheet ribbed on one side. The marble and opal glasses did not, but the frosted glass did permit an incandescent filament to be distinguished through it. Taking the transparency of the marble as 100, figures for the other sheets were found to be: Thin opal, 81; thick opal, 56; frosted glass, 300. When similarly illuminated and viewed side by side, the marble had a reddish-violet and the opal glass a greenish tinge by transmitted light, owing to the comparatively small amount of yellow-green and large amount of red and (particularly) blue transmitted by the marble. A marble front to a funnel-shaped reflector absorbed only about 20 per cent. of the light emitted by a lamp therein, whereas an opal glass cover absorbed about 40 per cent. The high transparency of frosted glass is obtained at the cost of poor diffusing power, but photometric tests show that this is not the case where marble is employed. The polar curve of light distribution from a point is at least as close an approximation to a circle when marble as when opal glass is used. The importance of the grinding and impregnating processes to which the marble is subjected, is shown by Table I, the figures in which refer to the lux transmitted through

TABLE I.

	Opal glass.	Dry marble ground on		Impregnated marble ground on	
		One side.	Both sides.	One side.	Both sides.
	Lux.	Lux.	Lux.	Lux.	Lux.
At centre of plate ...	11·0	17·4	20·7	25·0	28·0
4 cm. from centre ...	8·7	14·0	19·4	24·0	27·0
8 cm. " ...	6·2	9·2	12·0	16·0	18·8
12 cm. " ...	3·5	5·5	7·5	11·8	13·0
16 cm. " ...	1·7	3·2	4·1	8·5	9·7

6 sq. cm. areas at various distances from the centre of a test plate illuminated by a 25-c.p. tantalum lamp placed 10 cm. behind the latter. In uniformity of transmitted illumination, the marble far excels the opal glass. Candle-power measurements made at a distance of 2·4 m. from the same 40 × 40 cm. sheets, gave the following percentage results: Bare lamp, 100 per cent.; opal glass interposed, 17 per cent.; marble, ground on one side, dry, 23·5 per cent., impregnated 35·5 per cent.; marble, ground both sides, dry 29 per cent., impregnated, 39·4 per cent.

Measurements of illumination at 1·2 m. above floor level in a 5·4 × 7 m. laboratory, showed the following average consumption per lux per sq. m.; (the bracketed data refer to the minimum, maximum and mean illuminations): (1) Using three central clear 25 c.p. tungsten lamps and six frosted wall-bracket tungsten lamps (25 c.p. each)—0·31 watt per lux per sq. m.; (6, 70, 25·6 lux). (2) Using 400 c.p. Osram fitting with opal glass plates—0·43 watt per lux per sq. m. (10, 36, 20 lux). (3) Same as (2) but with marble plates in fitting—0·34 watt per lux (11, 55, 27·7 lux). The uniformity and efficiency of illumination in case (4) is remarkable; ceiling reflection did much to disguise in the above data the real superiority of the marble fitting as regards diffusing power.

Measurements of ultra-violet radiation received from a quartz mercury lamp directly and through marble and opal glass sheets in turn showed no important difference between the transparency

for visible and ultra-violet light, and hence afforded no explanation in this direction for the favourable characteristics of marble. On measuring the total radiation from a carbon-filament lamp, it was found that opal glass, though less transparent than marble to visible rays, was from 33⅓ to 6½ times as transparent as marble to total radiation. In other words, marble is relatively opaque to heat radiations (which are absent from diffused daylight, and if not injurious, are at least unnecessary to vision). Eye fatigue under artificial illumination is chiefly due to the reception of heat rays. Vogt has shown that the shorter infra-red rays do penetrate to the retina; indeed, radiations reaching the retina from a carbon-filament lamp are four-fifths dark and only one-fifth visible.

TABLE II. (Illumination by 32-c.p. Carbon Lamp throughout).

—	Photometer illumination. Lux.	Relative transparency to light.	Deflection of radiation meter.	Relative transparency to heat.	Relative energy transmitted for given light transmission.
Bare lamp	620	100	224°	100	100 (assumed)
Through—					
3 mm. dry marble ...	225	41	11·5°	5·1	12·4
3 mm. impregn'd marble	130	21	11·0°	4·9	23·3
0·5 mm. red-grey mica ...	200	33	151°	67·5	208
3 mm. ground glass ...	470	76	91°	40·6	53·4
2 mm. clear glass ...	570	92	179°	80	87
0·3 mm. ebonite	Nil	0	116°	51·7	—
White paper	170	27·5	10·8°	4·8	17·5
Ditto, oiled	340	55	37·5°	16·7	30·4
3 mm. dense opal glass...	155	25	38·2°	16·6	68

Semi-indirect lighting using marble fittings would appear to be perfectly safe and relatively efficient. Transparencies of various materials to luminous and thermal radiations are compared in Table II, which is well worth careful study. As regards minimum total energy transmitted for given light radiation, marble prepared according to the Engel process is the best material examined which can be used for lamp globes. It transmits maximum light and minimum heat, and can therefore be used with lamps of high candle-power without transmitting injurious heat rays. Thermal equilibrium is maintained by low-temperature radiations which cannot reach the retina.

BUSINESS NOTES.

Bankruptcy Proceedings.—Herbert James Godfrey, 23, Lucien Road, Tooting, London, late 188, Balham High Road, London, electrical engineer.—The first meeting of creditors herein was held at 132, York Road, Westminster Bridge Road, S.E., on September 15th, when the statement of affairs showed liabilities amounting to £582, to meet which there are net assets of £167, the estate disclosing a deficiency of £415. It appeared that the debtor started trading in 1899, at Defoe Road, Tooting, with a borrowed capital of £10. Debtor had since repaid that sum. About 1901 the debtor removed to 188, High Road, Balham, owing to the growth of his business, and he had since that time continued to trade there. He brought an action in October, 1913, to recover a book debt of £89. The action was defended by the book debtor, who paid £36 into Court, and set up a counterclaim of £90. Judgment was given in debtor's favour for £36 on the claim, and for the book debtor of £53 and costs on the counterclaim. The Sheriff levied execution on August 31st, 1914, on debtor's effects at the suit of the book debtor, and he thereupon filed his petition. Debtor sold the freehold premises, 23, Lucien Road, in December last, for £520. After payment of an existing mortgage and costs, a balance of about £80 remained, which was utilised in the payment of pressing creditors' claims. Debtor had kept a cash book, copy, invoice, and estimate book, work book, day-book and wages sheets. Debtor stated that he first became aware of his financial difficulties in July last. The case was a summary one, and was left with the Official Receiver. The following are creditors :—

Aland & Co.	£17	Godfrey, G. T.	£25
Crathorne & Green Mg. Co. ..	21	Rowe, A. F.	22
Crypto Electrical Co.	13	Siemens Bros. & Co.	18
Cox, R.	138	Sun Electrical Co.	51
Edison & Swan Co.	42	Sloan Electrical Co.	12
Evered & Co.	29	Veritys, Ltd.	44
Falk, Stadelmann & Co. ..	23		

Permanent Magnets.—Noticing an inquiry for British-made permanent magnets in a recent issue, the High Tension Co., of 62, Belvedere Road, S.E, inform us that for some time they have been using for their "Mira" car-lighting dynamos permanent magnets made by Messrs. Swift, Levick & Sons, Clarence Works, Sheffield, and have found them quite as satisfactory as the German and French magnets that they had previously used.

Point Controllers.—Messrs. Quilliam Bros. write that their Collins patent automatic point controllers are manufactured in Salford. The Liverpool Corporation Tramways alone has ordered 50 machines since the beginning of the year,

Private Arrangements.—Bristow Bros., electrical engineers, 46, Hans Crescent, London, S.W.—The creditors interested herein were called together recently, at the offices of Mr. Chas. E. Carr, 17, Harp Lane, Tower Street, E.C., when it was reported that the liabilities amounted to £540, while the assets consisted of book debts valued at £165, and stock in trade estimated to produce £40, or a total of £205. It was reported that the business was carried on by two brothers, who started trading a few years ago, with a sum of £65, which was advanced by their mother. In consequence of the moratorium, the debtors had been unable to get in their book debts. Further, one of the debtors had joined the Army, and as the other was about to do the same it was thought desirable to call the creditors together. It was decided that the estate should be wound up under a deed of assignment. A Committee of the principal creditors was appointed. The principal creditors are :—

Coleman & Turner	£158
Foster Engineering Co.	76
Siemens Bros. Dynamo Works	32
Crypto Electrical Co.	43
Baxter & Caunter	34

Australian Tariff Matters. — The *Melbourne Age* in a report on the proceedings at Sydney early in August, before the Inter-State Commission, says that the managing director of the British General Electric Co., Ltd., Mr. Edward Hirst, applied for a 10 per cent. British preference on various telephone and electrical fittings.

Mr. A. D. Stevenson, chief engineer and director of the British General Electric Co., Ltd., gave evidence in support of the application. He said the company had extensive works in England, in which British capital had been invested. Items affected by the application were telephone appliances and switchboards.

The Chairman: Do you ask that the foreign duty should be raised or the British duty lowered?—Witness: I think the former would have to be done. Personally, I would be satisfied with 5 per cent. I ask for preference on British telephones and electric starting and controlling apparatus.

Mr. Lockyer: You already have the bulk of the trade?—No, I do not think so.

Mr. Lockyer pointed out that in 1912 the imports were :—United Kingdom, £58,300; Belgium, £18,000; Sweden, £44,000; and the United States, £30,000.

The chairman said that last year these figures had been altered. The importations from the United Kingdom were £46,000; from the United States, £47,000; while those from Sweden had also increased. It was for the witness to indicate why he would not compete with the United States, where higher wages were paid.—Witness said the claim was made for preference on those lines where the tariff at present did not give it.

The Chairman: Are you able to get a fair share of the trade? Have your imports fallen away? How have you fared during the four years of your establishment here?—We have naturally gone ahead, but we find ourselves in competition with foreign manufacturers.

Mr. F. W. Mattes, telephone engineer for the British General Electric Co., and representative of Peel-Conner Telephone Works, Ltd., said that under existing conditions Swedish and American competition was particularly strong in such goods as small switchboards and magneto telephones.

Bastian Heaters.—The Bastian Electric Heating Syndicate, Ltd., of 185, Wardour Street, London, W., state that they are prepared to accept orders for their "A" type heater (code word "Cabin") loaded up to 2 kw. As at present constructed the heater is fitted with six Vitrolite glowers of 333 watts capacity each, and a switch is provided to reduce the rate of consumption to 1·3 kw. In this construction the "Tabasco" resistance wire is wound as a perfectly close spiral around the exterior surface of a quartz tube, the convolutions being prevented from short-circuiting one another by the oxide on the wire itself. This construction has many advantages, in addition to that of cheapness, to which special attention is drawn as the most interesting feature. At the present time the syndicate are more busy than they have ever been before at this season of the year, owing to large orders on hand for heating apparatus for H.M. warships, and there is every indication that they are to have a busy winter.

Catalogues & Lists.—Messrs. Crompton & Co., Ltd., Salisbury House, London Wall, London, E.C.—32-page catalogue consisting of a collection of illustrated lists very fully describing and stating prices, dimensions, and other particulars of a wide range of electric heating and cooking apparatus. The range includes restaurant type grillers and toasters, counter apparatus, hot cupboards, fryers, grill-room suites, household and dining table apparatus, cooking ranges, hot-water circulators, convector heaters, electric fires, &c.

The Edison & Swan United Electric Light Co., Ltd., have issued some large poster cards emphasising the fact, for the education of the public, that their drawn-wire lamps are in every respect British.

Messrs. Adnil Electric Co., Ltd., Artillery Lane, London, E.C.—Small booklet, No. 61, describing the "Century" single-phase motors.

St. Helens Cable and Rubber Co., Ltd., Warrington.—An advertising leaflet dealing with cab-tire sheathed cable for portable lamp flexibles, &c. This is quite a new and unique departure, being printed in colours in close imitation of an old illuminated manuscript, and has a very striking appearance. It informs us, *inter alia*, that C.T.S. wire is used for wiring in the worst situations, such as breweries, acid factories, and the Houses of Parliament.

Liquidations and Dissolutions.—Stolz Electrophone Co. (1913), Ltd., 85, Fleet Street, E.C.—Under the compulsory winding-up order made against this company last February, upon a creditor's petition, the report of Mr. H. E. Burgess, Official Receiver and Liquidator, has been issued to the creditors and shareholders. The accounts filed under the liquidation show liabilities £9,735, against assets valued at £1,387, and a deficiency of £68,348 as regards contributories. In the course of a detailed report on the company's affairs, it is stated that the business of the company appears to have suffered through neglect and want of organisation and too liberal terms being granted to agents. These considerations, and the fact that the company never had sufficient working capital, were the main causes of its failure.

The Ridings Arc Lamp Co., Ltd.—A meeting of creditors will be held at the North-Western Hotel, Lime Street, Liverpool, on October 19th, to hear an account of the winding up from the liquidator, Mr. F. Rawlinson.

The Consolidated Diesel Engine Manufacturers, Ltd., Aldwych, W.C.—First meeting of creditors and contributories, October 8th, at Bankruptcy Buildings, Carey Street, W.C.

Book Notices.—"*Proceedings* of the American Institute of Electrical Engineers." Vol. XXXIII, No. 9. New York: The Institute. Price $1.

"Text-book on Wireless Telegraphy." By R. Stanley. London: Longmans, Green & Co. Price 7s. 6d. net.

Circular of the Bureau of Standards No. 49, entitled "Safety Rules to be observed in the operation and maintenance of electrical equipment and lines." Issued August 1st, 1914. Washington, U.S.A.: Government Printing Office.

Cab Tire Sheathing.—In view of the resistance to corrosion, moisture and hardware manifested by the rubber compound used for cab-tire sheathed cable by the St. Helens Cable and Rubber Co., Ltd., the company are now supplying to Admiralty contractors other materials, such as sheet, tubing, &c., which were formerly made of ordinary rubber.

LIGHTING and POWER NOTES.

Aberdeen.—Year's Working.—The annual report of Mr. Bell on the Corporation electricity undertaking shows a total revenue of £60,353, an increase of £4,254 on the year before. The total working expenses, £29,036, were a decrease of £111 on the year before, this being traceable to the economy resulting from the use of a new 3,000-kw. turbine plant. A total of 9,700,000 units were sold, or about 500,000 in excess of the previous year, but 1,689 less tons of coal were used—4·1 lb. as compared with 4·74 lb. per unit—and thus despite an increase in price of coal of 1s. 4d. per ton, a saving was made on working expenses. The consumers now number 3,190; the motors connected total over 8,400 h.p., and 961 heating and cooking and similar devices are now out on hire. The gross profit, placed to reserve amounted to £4,960, the reserve fund amounting to over £26,000.

Aldershot.—Mains Extension.—The U.D.C. has decided to supply current to the new premises of the Aldershot and District Traction Co., Ltd., Halincote Road.

Ascot.—Plant Extensions.—A 400-h.p. gas engine is being installed at the Ascot District Gas and Electricity Company's works in place of a 90-h.p. suction gas engine set.

Australia.—Melbourne.—For some years a conflict has existed between the town clerk and the city electrical engineer, the former claiming the right to supervise and exercise authority over matters brought forward by the engineer. The City Council has been divided in opinion on the question. The engineer recently suggested that the price of energy for power should be reduced, and the town clerk opposed the reduction on the ground that it would result in a loss to the electricity undertaking. The matter was referred by the Council to Mr. Forbes M'Kay, city electrical engineer of Sydney, and an accountant, who are reported to have decided in favour of Mr. Harper, the city electrical engineer.

The Council has allocated a sum of £128,000 to the Electric Supply Committee, which will be used to replace moneys expended out of the depreciation account.

The Brunswick, Vic., Municipal Council has decided to borrow £10,000 for extension of the lighting and power scheme throughout the municipality. It is contemplated to light the whole of the streets electrically.

Ayr.—Annual Report.—There is a credit balance of £1,450 in the T.C. electricity department, and which has been placed to the reserve fund, which now amounts to £5,134.

Belfast.—The Sub-committee appointed to report on the electricity undertaking stated that it had considered, and recommended, the reports of Sir John Snell and Mr. Pratten, the consulting experts, in respect of the erection of a new station on a site to be obtained in Hamilton Road from the Harbour Commissioners. The Committee endorsed the reports for recommendation to the Corporation.

Banchory.—Lighting Scheme.—The T.C. is to ascertain what support it is likely to get from residents before proceeding further with the lighting scheme.

Blackpool.—Sea Front Illuminations.—Last week an order was issued by Col. Aspinall Turner, the officer commanding the troops in Barrow and district, restricting lights in exposed places within a 50 miles radius. A deputation from Blackpool interviewed the Colonel with reference to the possible effect upon the autumn illuminations, and was informed that the order did not affect the Blackpool scheme which will be carried out as arranged.

Broadstairs.—E.L. Scheme.—The U.D.C. has decided to return to the Isle of Thanet E.L. Co., £1,000 deposit under the terms of the order, cables having been laid in practically all the roads set out in the schedule.

Bury.—Power Station Extensions.—The Electricity Committee has instructed the borough engineer to complete plans for a three-bay extension to the electricity works at Chamber Hall.

The Committee has also agreed to subscribe to the Electrical Vehicle Committee of the I.M.E.A. for the purpose of propaganda work.

Bushey.—The U.D.C. has sealed a supplemental agreement with the Watford U.D.C. for the supply of current to the district.

Cleethorpes.—L.G.B. Inquiry.—An inquiry was held last week into an application of the U.D.C. to borrow £10,000 for mains extensions.

Clonakilty.—E.L. Scheme.—A company has been formed in connection with a scheme for lighting the town with electricity, and the work of installation has been commenced by the Ampere Electric Lighting Co.

Clones.—E.L. Scheme Completed.—The inauguration of the electric supply took place recently at the power house of the Clones Electric Light and Power Co., Ltd. The entire installation was designed and carried out by Mr. J. Woods, late of Bantry, Co. Cork, engineer and manager to the company.

Edinburgh.—E.L. Surplus.—The Electricity Committee has recommended that the whole of the last year's surplus profit, a sum of over £3,000, be applied to the relief of the rates.

Flint.—E.L. Scheme.—A special meeting of the T.C. is to be held to further consider the electric lighting proposals which have been laid before it.

Gildersome.—Prov. Order.—The U.D.C. has decided to support the Yorkshire Electric Power Co.'s application for lighting powers in the district.

Harrogate.—E.L. Powers Refused.—The T.C. has been informed that the B. of T. has refused the Corporation's application for permission to supply electricity to premises in the rural district of Knaresborough, outside the authorised area of supply, on the ground that the Council is developing a general supply outside the area. The borough electrical engineer was authorised to have certain repairs carried out to the Parsons turbo-generator, at a cost of £310.

Helsby.—Loan Sanction.—The L.G.B. has sanctioned a loan of £515 for electric power at the sewage works.

Hornsey.—Loans.—The Council are making application for power to borrow £4,000 required for house services.

Keighley.—At a meeting of the T.C. last week when it was reported that the sale of gas for the year ended June 30th last showed a decrease of nearly 6 million cb. ft., as compared with the previous year, the chairman of the Gas Committee strongly protested against the practice of selling electricity for lighting purposes in mills, &c., at power rates, stating that the loss on the gas undertaking was chiefly attributable to that practice. The chairman of the Electricity Committee considered that the statements made constituted a splendid compliment to the electricity department, which did not charge customers more than the value given, and then give the profit back to those who did not take electricity, in rate relief.

Lees.—Proposed E.L.—The U.D.C. has decided to approach the Springhead Council in connection with a supply of electrical energy in the district.

Littleborough.—Bulk Supply.—A deputation from the D.C. waited on the Rochdale Gas and Electricity Committee, asking for a revision of the agreement for the supply of electricity in bulk to Littleborough. The Rochdale Committee, whilst unable to reduce the price, agreed to a 10, instead of a 15 years' agreement, and to revise the minimum guarantee as regards quantity.

London.—Woolwich.—Last week a special meeting of the B.C. agreed to the L.C.C. being asked to sanction a loan of £10,000 for a 3,000-kw. turbo-alternator to meet the unexpected increase in demand for electricity by the military and Port authorities, &c.

Lewisham.—The Libraries Committee of the B.C. is considering the question of improving the lighting at the Brockley Library, which is at present carried out by gas. Local firms have been invited to tender for installing electric light, and the Committee is in communication with the Electric Light Co. as to the terms upon which it is willing to supply current.

Midhurst. — Overhead Wires. — The R.D.C. has decided to agree to the proposals of the Midhurst E.L. Co. for using overhead wires for E.L. purposes in the district, provided underground cables are laid in the town of Midhurst itself.

Mytholmroyd.—The U.D.C. has requested the Yorkshire E.P. Co. to send a representative to explain the scheme for supplying current for power and lighting at a cheap rate.

Nuneaton.—Several firms have applied to the T.C. for the release of retention money on contracts in connection with the electricity works, and as the sums are due for payment in a few weeks, the Council has decided not to entertain the applications.

Oban.—Street Lighting.—The engineer has been instructed to proceed with the conversion to electricity of a further section of street lighting; the Council intends to convert all the gas lamps in the burgh.

Rawtenstall.—At a meeting of the T.C., it was stated that the electric lighting of the Crawshawbooth district, which had been delayed by the recent bad weather, would be completed in a week's time.

Ross (Herefordshire). — Street Lighting. — The U.D.C. has decided to invite the gas and electric light companies to tender for the lighting and maintenance of the street lamps for a period of three years.

Sierra Leone.—Freetown.—An extraordinary meeting of the City Council was held on 19th ult., to consider the Colonial Secretary's letter of August 11th, informing the Council that Mr. Baron asks leave, under Clause 26 of the Electric Lighting Concession, to assign absolutely all interest in the contract to a new company. After the discussion the permission sought for was granted by a majority of votes.

Skipton. — Power Co.'s Bill. — The U.D.C. has elected a Committee to discuss with the company the proposed E.L. Bill.

TRAMWAY and RAILWAY NOTES.

Ayr.—Tramway Expenditure.—At a meeting of the T.C. it was stated that the cost of the tramway extension to Hawkhill had been £18,000. The income for the year was £860, and expenditure, exclusive of operating expenses, amounting to £1,572, had been incurred.

Australia.—The consulting engineer of the Brunswick-Coburg (Vic.) Tramways Trust has submitted his report on the construction of the line, the cost of which will be £134,610. It is anticipated that tenders for most of the work will be called for this year. A committee, consisting of members of the Melbourne City Council, the Trust, and the Brunswick and Coburg Councils, is considering the report. The Melbourne City Council is recommended by its representatives to join the Trust, and enable the line to connect Brunswick with the city to be constructed.

Belfast.—The revenue of the tramways for the five months ended August 31st shows a balance, after allowing for all fixed charges, of £13,651. The electrical engineer reported on tenders for the supply of an electric motor tower wagon, and that of the Edison Accumulators, Ltd., was recommended to the Council for acceptance.

Edinburgh.—A special meeting of the T.C. Tramway Committee is to consider the whole question of tramways with regard to the taking over and working of the existing lines by the Corporation, additional routes, extensions and methods of traction.

London.—A breakdown occurred on the City and South London tube line at London Bridge on Monday. Four stations between Old Street and Elephant and Castle were closed for an hour.

Norwich.—Track Renewal.—The Tramway Co. has decided to continue the work of renewing the tramway track from the foot of the Guildhall Hill to St. Giles Gate. The work was commenced on Monday last from the Guildhall end of the section, and is helping to relieve the labour situation to some extent.

U.S.A.—Electric Vehicle.—A proposal is at present under consideration to organise a National Electric Vehicle Day to be observed all over the country, by parades of electrically-propelled vehicles. It is considered that the public would thereby get an idea of the extent to which electric vehicles are now used for both pleasure and business purposes, and that the movement would consequently receive a further impetus.

TELEGRAPH and TELEPHONE NOTES.

Australia.—The automatic telephone system is proving very popular in Australia, and orders for nine exchanges, aggregating 15,000 lines, are now being executed by the Automatic Telephones, Australasia, Ltd., in addition to those already equipped.

Bolton.—The Postmaster-General states that work is now in progress in connection with the provision of a new telephone cable between Bolton and Manchester, and that it will probably be completed about the end of the year. It is hoped to place the Bolton-Manchester trunk service on the "immediate connection" system next year.

Cable Tariffs.—The use of codes being prohibited at present, the P.M.G. has arranged with the Eastern telegraph companies as a temporary measure that the text of full-rate extra-European messages in plain language shall be counted and charged for as if written in groups of 10 letters to one word. It is hoped that this arrangement will be extended to other cable systems. Complaints are made that the concession is inadequate, and further relief is called for.

United States.—The wireless station at Tuckerton has completely broken down as the result of an accident, and as the broken parts can only be repaired in Germany, and the German-American trans-Atlantic cable has been cut, the representatives of Germany in the U.S.A. have now no means of communication in cipher with Berlin.

Wireless Amateurs Charged.—At Dublin Police Court, A. E. Archer was recently charged with having established and used a wireless installation at his father's house, in defiance of a warning from the Post Office. The apparatus was removed, but the defendant was discharged, the military authorities being satisfied that there was no guilty intention on his part.

A court-martial was held on Saturday last on W. Sharpe, of Thorne, who was in possession of wireless receiving apparatus, and stated that he had not seen the order prohibiting its use; the defendant was found not guilty and discharged.

Wireless Operators for the Navy.—On Friday last the Admiralty announced that no further wireless telegraph operators in the Royal Naval Reserve were required for the present.

Wireless Station Captured.—The German wireless station on the Island of Nauru (Pleasant Island) has been captured by an Australian force, and now, it is stated, the enemy have no wireless stations in the Pacific.

CONTRACTS OPEN and CLOSED.

OPEN.

Australia. — Melbourne. — October 12th. Three-phase motors for workshop machinery, for Melbourne Suburban Railways. See "Official Notices" September 4th.

November 25th. Victorian Railways. 25 battery signal machines for operating signals. Contract 27,479. Contractors' Room, Railway Offices, Spencer Street.

Adelaide. — October 28th. Telephones and flexiphones, telephone instruments and parts, for the Postmaster-General. See "Official Notices" September 18th.

November 4th. Telephone instruments and parts, for Postmaster-General. See "Official Notices" to-day.

Perth. — November 18th. P.M.G.'s Dept. 249 accumulators with assorted apparatus, for telegraph office, Norseman.—*Tenders.*

Brisbane. — December 15th. Switchboard, common battery, automatic or semi-automatic, for the Postmaster-General. See "Official Notices" to-day.

Birkenhead.—September 26th. E.L. plant, gas suction plant with dynamo and additional battery, &c., for the Clatterbridge Infectious Diseases Hospital, for the Wirral Joint Hospital Board. Mr. J. E. S. Ollive, Clerk, 54, Hamilton Street, Birkenhead.

Bolton.—September 28th. Telephone installation, Townley's Hospitals, Farnworth, for the B. of G. Mr. John Ward, Architect, 24, Mawdsley Street, Bolton.

Bury (Lancs.).—Three-bay extension at the electricity works, for the T.C. Borough Engineer.

Colwyn Bay.—October 20th. Turbo-alternators and jet condensing plant; water-tube boilers, chain-grate stokers, feed pumps, &c.; switchgear for power station and sub-station; cooling tower; travelling crane; power station cabling and wiring; underground cables; rotaries and transformers, for the U.D.C. See "Official Notices" to-day.

Heywood.—October 17th. Corporation. Converting plant, A.C. and D.C. switchgear and cables, battery booster, E.H.T. overhead line, E.H.T. switchgear for sub-station. See "Official Notices" to-day.

Hornsey.—October 9th. Two rotary or motor converter sets, &c., for the T.C. See "Official Notices" September 18th.

Littleborough.—October 12th. U.D.C. (1) Removal of transformer kiosk and gear and connection of mains to new sub-station; provision of additional cables, road work, &c. (2) Transformers, equipment and switchgear, for new sub-station. See "Official Notices" to-day.

London.—L.C.C.—September 28th. Installation, 215 wiring points, 285 lighting points, at Gifford Street Elementary School, Caledonian Road, N. See "Official Notices" September 18th.

October 8th. Installation, 320 wiring points, 420 lights, at Vallance Road Schools, Mile End, E. See "Official Notices" to-day.

Manchester.—October 6th. Supply of a car-wheel tire boring mill. Specifications, Mr. J. M. McElroy, General Manager.

October 6th.—The Tramways Committee is inviting tenders for scrap materials, comprising miscellaneous copper, gun-metal and brass, &c.

Rochdale.—October 7th. Steam coal for Dane Street electric power station. Mr. C. C. Atchison, Engineer and Manager.

South Africa.—JOHANNESBURG.—October 9th. Ten single-truck double-decked electric tramcars, for Municipal Council. Specifications, &c., may be seen at Commercial Intelligence Branch of Board of Trade.

Spain.—Tenders have just been invited by the municipal authorities of Almaguer (Province of Toledo) for the concession for the electric lighting of the town during a period of six years.

October 28th. Municipal authorities of Salamanca invite tenders for the concession for the electric lighting of the town.

Swansea.—October 5th. Corporation. Lighting installation at Police Station. See "Official Notices" to-day.

Walsall.—September 29th. Corporation. Extra H.T. switchgear, static transformers, L.T. switchgear. See "Official Notices" September 11th.

Warrington.—September 29th. H.T. cable for the Electricity Department. See "Official Notices" September 18th.

Whitby.—September 30th. U.D.C. Construction of cliff tramway or lift. Particulars from the Clerk to the Council.

Whitefield.—September 28th. Electric motors, centrifugal pumps, sewage ejector, sewage disposal works. Specifications, &c., one guinea. Mr. G. M. Denton, Engineer and Surveyor, Council Offices, Whitefield.

Wigan.—September 29th. The E.L. Committee invites tenders for cast and steel scrap. Town Clerk.

CLOSED.

Attercliffe.—H.M. Government has placed the contract for the electrical installation at the new Labour Exchange at Attercliffe with the Sheffield branch of the Mechanical and Electrical Engineering Co., of Walsall.

Government Contracts.—The following tenders have been accepted during the past month by the Government departments named:—

H.M. OFFICE OF WORKS.

Electric wiring.—Marlborough House. Trollope & Colls, Ltd.

POST OFFICE.

Protective apparatus.—Western Electric Co., Ltd.
Telephonic apparatus.—Automatic Telephone Manufacturing Co., Ltd.; British L. M. Ericsson Manufacturing Co., Ltd.; Western Electric Co., Ltd.
Silence cabinets.—Matthew, Hunter & Sons.
Submarine cable.—Siemens Bros. & Co., Ltd.; Telegraph Construction and Maintenance Co., Ltd.
Telephone cable.—Connolly Bros., Ltd.; W. T. Glover & Co., Ltd.; W. T. Henley's Telegraph Works, Ltd.; Johnson & Phillips, Ltd.; Siemens Bros. and Co., Ltd.; Telegraph Construction & Maintenance Co., Ltd.; Western Electric Co., Ltd.
Stoneware ducts.—Albion Clay Co., Ltd.
Telegraph paper.—Waterlow & Sons, Ltd.
Bronze wire.—T. Bolton & Sons, Ltd.; B.I. and Helsby Cables, Ltd.; Shropshire Iron Co., Ltd.; F. Smith & Co., inc. in the London Electric Wire Co., and Smiths, Ltd.
Copper wire.—F. Smith & Co., inc. in the London Electric Wire Co.
Automatic telephone exchange equipment, Blackburn.—Automatic Telephone Manufacturing Co., Ltd.
Telephone exchange equipment, Admiralty.—Siemens Bros. & Co., Ltd.
Telephone exchange equipment, Wilmslow.—Peel-Conner Telephone Works, Ltd.
Telephone exchange equipment (extension), Walthamstow.—Western Electric Co., Ltd.
Laying lines of self-aligning ducts at York.—A. Schofield.

INDIA OFFICE, STORE DEPARTMENT.

Engines.—Lancashire Dynamo and Motor Co., Ltd.
Sounders.—Automatic Telephone Manufacturing Co., Ltd.
Switchboards.—Peel-Conner Telephone Works.

CROWN AGENTS FOR THE COLONIES.

Train lighting dynamos.—Mather & Platt, Ltd.
Electrical apparatus.—Electric Construction Co., Ltd.
"Lux" cells.—Chloride Electrical Storage Co., Ltd.
Telegraph material.—Bullers, Ltd.
Telegraph poles and line material.—Siemens Bros. & Co., Ltd.
Tramway spares.—R. Hudson & Co.
Bronze wire.—F. Smith & Co., Ltd.

Harrogate.—The T.C. has accepted the tender of Messrs. C. A. Parsons & Co. for alterations, &c., to the turbo-electric generator, at £310.

High Wycombe.—The T.C. has received the following tenders for the refuse destructor, with water softener:—

Goodrich & Hamblyn	(accepted) £1,987
Meldrums, Ltd.	£1,806, 2,361, and 2,436
Manlove, Alliott & Co., Ltd.	4,735
Hughes & Stirling	3,466
Heenan & Froude	3,340
New Destructor Co.	2,699

Belfast.—An important contract has been placed with the General Electric Co., Ltd., Belfast, by the York Road branch of the York Street Flax Spinning Co. for an electrical plant for the individual driving of spinning frames. This is one of the first installations of its kind in Ireland. The entire equipment will be manufactured at the G.E.C. Witton works.

London.—WANDSWORTH.—The Guardians are recommended to accept the tender of the Western Electric Co., Ltd., at £85 10s., for the provision of an additional internal telephone exchange at the St. James' Infirmary.

HAMMERSMITH.—The B.C.'s Electricity Committee has accepted the offer of the British Electric Transformer Co., Ltd., to supply one 150-KW. transformer, for £118.

H.M. Office of Works has just placed a contract with Messrs. J. H. Tucker & Co., for the supply during the next three years of the following tumbler switches: S.P., 5 amp.; S.P., 10 amp.; D.P., 5 amp.; D.P., 10 amp.; S.P., 5 amp., two-way, all of the firm's well-known No. 20 positive action pattern. The switches are to be mounted on either white or black china bases, with fluted or plain brass covers lined.

Norwich.—The T.C. has accepted the tender of Messrs. J. Anderson & Sons, at £423, for the erection of an electric light sub-station at Northcote Road.

Swinton.—The D.C. has accepted the tender of the Lancashire Electric Power Co., for providing and fixing the necessary equipment for the electric lighting of Bolton Road, Manchester Road, Chorley Road and Station Road, for £1,800.

Walthamstow.—The following tenders are recommended to the U.D.C. for acceptance:—

Walter Scott, Ltd.—Steel rails (Sandberg), fish-plates, &c.
Edgar Allen & Co., Ltd.—Castings.
Bayliss, Jones & Bayliss.—Fish-bolts, rivets and tie-bars.
Watlington & Co., Ltd.—Copper bonds.

Whitby.—The Guardians have accepted the tender of Messrs. Manlove, Alliott & Co., Ltd., for the refitting of the laundry with an electric power installation for £404.

FORTHCOMING EVENT.

Salford Technical and Engineering Association.—Saturday, October 3rd Visit to Textile Department, Royal Technical Institute, Salford.

NOTES.

The B.E.A.M.A. and the State of War.—Our contemporary, *Electrical Engineering*, states that the ELECTRICAL REVIEW was requested by the B.E.A.M.A. not to publish the "State of War" resolutions. This is a gross misstatement. No such request was made to us. We have communicated with the secretary who authorises us to state that he is in no way responsible for our contemporary's error, which is probably due to the editor's own imagination.

Ediswan Rifle Range.—The Edison & Swan United Electric Light Co, Ltd., have opened a rifle range at Ponder's End, with ranges of 25, 50 and 75 yards. The club already embraces a large and active membership. It is intended to cover in the range during the winter months.

Electrical Workers at Greenock Torpedo Factory.—In the House of Commons, on Wednesday, Mr. Barnes asked the First Lord of the Admiralty whether he was aware that at the Greenock Torpedo Factory electrical repair work was almost entirely done by naval pensioners at wages considerably below the standard rate for electrical workers, which was 10½d. an hour; and whether, in the event of any vacancies occurring, electrical workers would be employed at the proper rate. Dr. Macnamara promised to inquire into the matter.

Institution Notes.—Greenock Electrical Society.—The office bearers for the new season include as hon. president, Mr. Archd. Robertson, manager of the Greenock and Port Glasgow Tramways Co.; president, Mr. D. McDougall, of the Corporation electricity department. The secretary, Mr. Jas. Frew, is on active service, so an interim secretary, Mr. W. B. Smith, A.M.I.E.E., of the Electricity Showrooms, Greenock, has been appointed.

The arrangements for October are as follows:—

October 1st. "'Cottonopolis' and its Electricity Supply." By F. H. Whysall, M.I.E.E.

October 8th. Visit to Hunter Place Sub-station, Greenock.

October 15th. "Alternating Currents." By J. H. Parker, A.M.I.E.E.

October 29th. "Manufacture of Electric Cables." By R. A. D. Macalister, A.M.I.E.E.

Press Visit to the Osram Lamp Works.—On Wednesday a number of representatives of the daily and technical Press accepted the invitation of the General Electric Co., Ltd., to inspect the manufacture of Osram lamps at the Brook Green Works, Hammersmith. Every department of the works, which are one of the largest in the world devoted to the manufacture of tungsten lamps, was thrown open to the visitors, who were also afforded the privilege, previously withheld in this country, of witnessing the manufacturing of the tungsten filaments from tungsten in the finely powdered form.

The various processes connected with the manufacture of ordinary tungsten and the new half-watt lamp were explained to the visitors; as was explained in a previous issue, the glassware is obtained from the company's works at Lemington-on-Tyne, and even lamp caps so long imported are being made at Hammersmith—the lamp produced being essentially "all-British." At the conclusion of the inspection the visitors were entertained to luncheon, Mr. Ernest Byng presiding, when the speakers included the Mayor of Hammersmith and Mr. Christopher Wilson, manager of the Osram and Robertson Works.

British Radium.—The *Times* states that the British Radium Corporation has for a considerable time past been manufacturing, under the supervision of Sir William Ramsay, F.R.S., and Mr. Norman Whitehouse, and selling the purest radium bromide obtainable by the medical profession, and has already manufactured and sold radium products exceeding £40,000 in value. All this radium was produced from pitchblende mined in Cornwall, and the corporation has recently completed new works at Elmers End.

Airships over London.—It is reported that the experiments mentioned in our last issue proved satisfactory, and that it was impossible to pick out the buildings in the darkened City. By an Order in Council the Home Secretary has been empowered to order that lights of any description shall be extinguished or obscured.

The Moratorium.—The Treasury has issued an official notice to the effect that the moratorium will not be extended beyond October 4th in relation to bills of exchange (other than cheques or bills on demand), nor in so far as it applies to debts due to and by retail traders in respect of their business as such, and to rent. As regards other debts to which the moratorium applies, there will be an extension to November 4th, on which date the general moratorium is to come to an end as regards all debts.

Inquiries.—British makers of heat-resisting globes, for use on single-enclosure arc lamps, and makers of "Wigan tape," are asked for.

"Nobrac" asks to be put in touch with any firms in this country manufacturing, or capable of manufacturing, grinding, mixing, and pressing machinery suitable for the manufacture of arc lamp carbons.

Electric Searchlights.—In the course of a paper read before the Victorian Institute of Electrical Engineers, by Mr. E. H. W. Westwood, the author described the Parsons, Stoney and Bennett's patent protected mirror, which has been specially designed in order that the light may not be put out of commission due to gun shot, or other accident. Wire netting performs the function of binding together the glass reflector. This mirror, although shot and fractured, passed the Admiralty test for aberration, and was quite serviceable even after receiving two or three shots more. It is claimed that this reflector has advantages over the metal reflector, and higher efficiency with reference to reflection, 97-99 per cent. being obtained, while for metal only 70-75 per cent. was obtained under actual tests. This reflector has also the advantage of suffering no damage due to handling or cleaning.

After explaining the use of prisms or lenses for producing a diverging beam, the author stated that with the object of obviating the necessity of having additional lenses, experiments had been made with a reflector which had vertical sections parabolas and horizontal sections hyperbolas, resulting in rays spread horizontally, the dispersing angle depending upon the shape of the hyperbola. Such a form is used for Suez Canal navigation. The Siemens and Parsons lamps appeared to be most popular through Suez.

Messrs. Parsons had developed this class of reflector specially, and undertook to throw a beam through a narrow loophole, with their flat projected beam, the object of which was to show a very small beam of light to avoid gunfire risk. In these reflectors, one axis is considered for parabolic results, and the other for an ellipse. So accurately are these made that the manufacturers are prepared to guarantee to project the whole rays of light of a 10-ampere arc, reflected from their standard 35½-in. reflector of 16½-in. focus, through a loophole only 3 in. wide. Amongst the practical applications of searchlights on land, the author mentioned their use by fire brigades and for advertising purposes, and stated that a giant searchlight was perched in the lofty fire tower on the tallest skyscraper in Indianapolis. The searchlight is of 18,000 c.p., and the lens 38 in. in diameter. When a burglar alarm is turned in, the huge searchlight is played on the place which has been robbed, and by a series of rapid signals all the patrolmen in the vicinity are put upon the trail at once. The district is entirely surrounded, and it is only with the greatest difficulty that the thief effects an escape. Before the light was installed, the desk sergeant at headquarters could not give the officers news of a robbery until they made their hourly call, which in some cases might mean a delay of 59 minutes.

The I.E.E. and the War.—As mentioned in our issue of September 11th, the three leading engineering institutions are co-operating in raising a force for service with the new armies, and the opportunity afforded by the First Lord of the Admiralty in forming a Royal Naval Division has come at a timely moment. We are informed by the President of the Institution of Electrical Engineers, Mr. W. Duddell, that the Admiralty has invited the three Institutions to assist in obtaining picked men for the Divisional Engineer Units and Signal Company of the Royal Naval Division, which will be raised on the lines of the undermentioned units of the military forces:—

One Divisional Headquarters R.E.
Two Field Companies R.E.
One Signal Company R.E.

The Division is being raised under the Admiralty with a view to its employment in the field, and the engineer units for which recruits are now being asked will be employed on duties similar to those on which Royal Engineer units are employed. Recruiting has been going on briskly, and a camp has been prepared near Martin Mill Station, Kent, to receive the recruits, many of whom are already there; the authorised strength will total some 500 men, with 18 officers, in addition to the commanding Royal Engineer and a medical officer. It is expected that a considerable number of the officers will be selected from among the recruits.

The terms of enlistment will be for the duration of the war, but not in any case exceeding three years. Pay is under consideration, but will not be less than the Army rates, and the conditions of service will be similar to those of the Army. (Information as to Army pay and service can be obtained at any recruiting office.) Applications are invited from members of all classes of the Institutions of Civil, Electrical and Mechanical Engineers, as well as from members of other professional societies, between the ages of 19 and 35, either in person at the Special Recruiting Office, 2, Savoy Hill, Victoria Embankment, London, W.C., or by letter to the secretary of the Institution.

We may add that the whole of the work of recruiting, attesting and dispatching recruits has been undertaken by the staff of the I.E.E., which has also provided the necessary accommodation in the shape of offices, waiting room, and rooms for the medical examination and swearing-in of recruits at its headquarters on the Embankment, which have lately presented a scene of animation very unusual at this time of the year. Although the Institutions have entered the field at a late hour, when, no doubt, many of their members have already enlisted in other branches of the Service, there has been a hearty response to the summons to the Colours. Early application is advisable, as the recruiting office will not long remain open.

The Patent Position of Half-Watt Lamps and Tungsten Lamps.—The following letter was received after our "Correspondence" columns were closed:—

Your issue dated the 11th inst. contained an inquiry from the Electrical Engineering and Equipment Co., Ltd., as to the patent position in regard to half-watt lamps. Following this letter appeared a note from yourselves to the effect that you believed that the principal patents covering the half-watt lamp in this country were owned by the British Thomson-Houston Co., Ltd.

You were correct in your belief. Not only does this company own the British master patents for half-watt lamps, but it also owns the fundamental patents covering the manufacture of drawn-wire tungsten lamps in this country. As you know, the Mazda drawn-wire process had a revolutionary effect on metal-filament lamp manufacture, and was, without question, the greatest advance since the introduction of metal-filament lamps. The drawn-wire process was destined to have a greater effect than anyone imagined. It made possible a strong and durable lamp filament capable of withstanding all service conditions—even the severe conditions of tramcar service and service on battleships. It made possible the shaping of the filament in any desired form to give concentration of the light, as witness, for instance, the perfection of motor-car lighting brought about by the Mazda automobile lamp with its helical point filament of drawn wire. But the greatest development of all is the half-watt lamp, and you yourselves, who have seen these lamps made in our lamp works at Rugby, will testify that without the previous introduction of the drawn-wire process, half-watt lamps would not be available to-day.

F. W. Willcox,
Manager, Lamp and Wiring Supplies Department, The British Thomson-Houston Co., Ltd.
September 23rd, 1914.

B.E.A.M.A. Council.—At a meeting of the Council of the British Electrical and Allied Manufacturers' Association, held at the offices on the 17th inst., Mr. B. H. Antill, director and manager of Messrs. Siemens Bros. Dynamo Works, Ltd., was elected a member of the Council, vice Mr. C. Koettgen, resigned.

Special Fire Service.—A Special Fire Service Force for war time has been organised by the British Fire Prevention Committee, with a nucleus of 300 fire surveyors, fire brigade officers, patrol inspectors and firemen. Parties can be dispatched for fire survey, pulling down and dangerous structure work, at short call; a number of fire patrols, comprising skilled patrol men, can be put on either night work or permanent watches, and several complete fire service sections, comprising fire-brigade officers and firemen with equipment complete, can be immediately mobilised to take up regular duty wherever requisitioned by public departments or other authorities requiring assistance in the national interest.

The direction and inspection of units is conducted by a small Headquarters Committee, of which the Earl of Londesborough is chairman. The British Fire Prevention Committee's office staff is conducting the secretarial work, and part of the Committee's testing station is at the disposal of the force as a depôt.

The fire surveyors and principal fire brigade officers are rendering gratuitous service, whilst the inspectors, foremen, firemen, patrolmen and clerks receive a moderate honorarium when on service.

All applications to render personal service, and all inquiries, should be addressed to the Registrar, the British Fire Prevention Committee, 8, Waterloo Place, London, S.W.

The Electro-Harmonic Society.—The twenty-ninth season of the Electro-Harmonic Society opens on Friday, October 9th, with a smoking concert. The following is a list of the events of the season, all of which will take place in the King's Hall, Holborn Restaurant:—

Friday, October 9th.—Smoking concert.
Monday, November 16th.—Ladies' night.
Friday, December 11th.—Smoking concert.
Friday, January 1st, 1915.—Smoking concert.
Monday, February 8th.—Ladies' night.
Friday, March 19th.—Smoking concert.

For the information of those who are not members of the Society, we may say that the entrance fee is 5s., and the annual subscription 10s. 6d. Mr. W. E. Lane, of Finsbury Pavement House, E.C., is hon. secretary.

Legal.—Eclipse Electric Sign Co., Ltd., *v.* Ashton.—The plaintiffs in this action, represented by Mr. Ashton Cross, moved before Mr. Justice Sankey, as Vacation Judge, on Wednesday, September 23rd, for an interim injunction to restrain the defendants from interfering with their possession of a certain office and preventing them from obtaining access to their books.

The offices, said counsel, were let to the plaintiffs, but on August 24th the defendants gave orders not to let them in, and declined to let their representatives have access to the books.

Counsel for the defendants contended that he had a right to turn them out neck and crop, as no rent had been paid, and that the company was not English, but alien, and therefore had no right to take advantage of the moratorium. Further, he submitted that no useful purpose would be served by granting the injunction, as the plaintiffs' tenancy expired in six days.

His Lordship granted the injunction asked for on the plaintiffs' undertaking to give up possession on September 29th next.

Educational Notes. — Northampton Polytechnic Institute.—We have received the "Announcements" for the Session 1914-15, which gives particulars of the educational and social amenities of the Institute. The programme was, of course, drawn up before the present abnormal state of public affairs arose, and it is uncertain what effect the change will have upon the work of the various departments, but, generally speaking, all the classes announced will be started, and most, if not all, of the work will be carried out as fully as possible. In the electrical engineering department there are to be two series of advanced lectures, by Mr. W. C. Kennett, B.Sc., A.M.I.E.E., on Transformer Design, and by Mr. A. C. Heap, M.I.E.E., on Electrical Instruments and Switchgear. There are also special classes in Submarine Cable Work and Radio-Telegraphy, the latter under the direction of Mr. E. S. Perrin, B.Sc., of the Engineer-in-Chief's staff of the Post Office.

Polytechnic School of Electricity.—Special courses in electricity, electrical engineering and physics commence on Monday, September 28th, under the direction of Mr. W. Hibbert.

Battersea Polytechnic, S.W.—Special course in electrical costs and quantities, by Mr. W. Brew, Thursday evenings, at 7.15, commencing October 1st. Particulars are given in our advertisement pages to-day.

Appointments Vacant.—Plumber jointer (£23 month), for Singapore Municipality; shift engineer (30s.), for Neath R.D.C.; fitter-driver, temporarily (35s.), for Severalls Asylum, Colchester; junior assistant engineer (15s.), for Newcastle-upon-Tyne Electric Supply Co.; electrician (Rs. 200 per month), for East Indian Railway; switchboard attendant (32s.), for Bermondsey B.C.; assistant engineer, for Sale U.D.C.; two switchboard attendants for Cleckheaton U.D.C. Particulars are given in our advertisement pages.

Fares and Traffic.—Figures presented at the last conference of the American Electric Railway and allied associations show that halfpenny and penny reductions in street railway fares have given disappointing results as regards increase of traffic obtained. Probably where such small amounts are concerned, a much larger percentage reduction is required than in ordinary trading before stimulation proportional to price reduction is obtained. On the other hand, the experience of the Hudson and Manhattan Railway (as reported in the *Engineering News*) shows that increase in fares seriously reduces the traffic carried and affects adversely the gross income. The Hudson and Manhattan Co. operates two pairs of rapid transit electric railway tunnels between New York and New Jersey. Its investment in tunnel construction is very heavy, and in view of continuous deficits, the company decided in December, 1911, to raise the fare on the up-town tubs from 2½d. to 3½d. Though the increase appeared quite justifiable, it turned out to be a false move. Ticket sales showed a marked decrease for each month in 1912 (as compared with 1911) and a continued but less marked decrease in 1913. The fare increase was reasonable, but it resulted in a net decrease of 17·6 per cent. in ticket sales during 1912, as compared with 22·8 per cent. increase in 1911, and in 1913 the up-town traffic showed a further decrease of 5·8 per cent. Excluding joint line tickets (available over the Pennsylvania Railroad to Newark), traffic on the down-town tubes showed 2·9 per cent. decrease in 1912, but 47·4 per cent. increase in 1913. The temporary slump on this line is not easily explained, but the trouble on the up-town line was, doubtless, due to the reluctance of passengers to pay 40 per cent. increase in fare while there existed reasonable ferry and surface-line facilities. During the two years since the fare increase was effected, the gross income has been raised, by this increase, about £194,000, but, under the old fares, the increase would have been £260,000 had traffic continued to expand at only half the rate at which it was growing when the new fare was introduced.

The Public Service Commission holds that the operating expenses (8·25d. per mile) are too high for a system of this sort, but in 1913 they increased further to 8·55d. Corresponding figures for the subway were 5·05d. in both years. The operating costs per passenger were 1·08d. and 1·16d. in 1912 and 1913, as against 1·08d. on the subway. The passengers per mile of track (3½ millions) is high, but below the New York subway figure (4¼ millions); due to the short run, the passengers per car-mile were 7·6 and 7·4 in 1912 and 1913, as compared with 4·7 and 5·1 for the subway; but the car-hours per mile of track (26,500 and 24,000) are little more than half the subway figures. The Commission states that the traffic density rather than the yield per passenger should have been increased. On this short route as many as 7 million passengers per track-mile per annum could be carried without overcrowding.

OUR PERSONAL COLUMN.

The Editors invite electrical engineers, whether connected with the technical or the commercial side of the profession and industry, also electric tramway and railway officials, to keep readers of the Electrical Review *posted as to their movements.*

Central Station Officials.—On the recommendation of Mr. Whysall, the new engineer of the Greenock electricity department, Mr. J. H. Parker, who took charge of the undertaking during the vacancy caused by Mr. Robertson's resignation, has been appointed chief assistant of the department.

Messrs. J. T. Rodwell and W. Burgess, engineers-in-charge of the Hornsey Borough electricity works, and Mr. A. F. Bond (junior engineer-in-charge) have joined the Colours.

A recommendation by the Hastings Electricity and Public Lighting Committee forthwith to increase the salary of Mr. A. J. Ryan, chief assistant electrical engineer, to the maximum of £180 (reached by the terms of the appointment in May, 1916), was, on September 18th, lost, the voting for and against being equal.

The Radcliffe U.D.C. has appointed Mr. W. Jackson, of Burnley, as shift engineer at the electricity works.

Mr. L. C. F. Bellamy, engineer and manager of the Ilkeston tramways and electricity department, has joined the new Royal Naval Division, with leave of absence from his Council, and went into camp at Martin Mill on Thursday.

General.—The vacancy caused through the death of Mr. R. W. Edge, for many years the greatly esteemed manager of the Manchester branch of Messrs. Berry, Skinner & Co., has been filled by Mr. A. Shelton, from Birmingham. Mr. Shelton has an intimate knowledge of the fool-proof switchgear manufactured by the firm, having been employed for the last six years under the works manager, Mr. W. J. Markham; previously for seven years he was with the Electric Construction Co., of Wolverhampton. Mr. Shelton will be pleased to meet old and new friends at Messrs. Berry, Skinner & Co.'s office, 65, King Street, Manchester.

Councillor Pridmore, chairman of the Tramways Committee, and who has been chairman of the E.L. Committee, has been invited to become Mayor of Coventry on November 9th.

Obituary.—Mr. Edward Riley, whose work in connection with the Bessemer steel process made him famous, and who passed away recently at the age of 83 years, was a director of the Windsor Electrical Co. from its inception in 1895.

In the "Roll of Honour" list issued by the War Office on Monday last the following announcement appeared:—

"Killed. Captain Lord Guernsey, Irish Guards."

Lord Guernsey was chairman of Messrs. Duram, Ltd., a company registered in September, 1912, which commenced the manufacture of tungsten wire at Hanwell. We visited the works last year, and briefly commented on its interesting products in our issue of December 5th, 1913.

NEW COMPANIES REGISTERED.

British Industries Support Federation, Ltd. (137,680).—This company was registered on September 15th, with a capital of £2,500 in 1s. shares, to carry on the business indicated by the title. The subscribers are:—E. D. Carey, 120, Clapham Road, S.W., surveyor and valuer, 2,000 shares; A. T. M. Jones, Holmstone, Harlesden, N.W., coal factor, 2,500 shares; J. H. Ogden, 56, Milton Street, Southend-on-Sea, civil engineer, 2,000 shares; A. Fraser, Lincoln's Inn, W.C., gentleman, 1,000 shares. Private company. The number of directors is not to be less than three or more than seven; the first are not named; qualification (except first directors, £100; remuneration, £100 each per annum (chairman £125). Solicitor, L. M. Parkin, 114a, Chancery Lane, W.C.; secretary, E. D. Carey. Registered office, Central House, 34 and 36, Oxford Street, W.

OFFICIAL RETURNS OF ELECTRICAL COMPANIES.

Brush Electrical Engineering Co., Ltd.—A memorandum of satisfaction in full on October 2nd, 1912, of prior lien second deb. stock, dated December 28th, 1911, securing £75,000, of which only £70,000 was issued. (Notified September 15th, 1914.)

North Wales Power and Traction Co., Ltd.—Particulars of "B" mortgage debs., to secure £21,000 and a premium of 50 per cent. thereon, created as to £7,000 on January 31st, 1912, and as to £14,000 on June 19th, 1913, filed pursuant to Sec. 93 (3) of the Companies' (Consolidation) Act, 1908, the amount of the present issue being £14,000. Property charged: The company's undertaking and property, present and future, including uncalled capital, subject to £40,000 and interest at 6 per cent. per annum secured to the Law Debenture Corporation, Ltd., secured by (a) charge dated August 15th, 1905, modified by indentures of April 18th, 1907, and (b) £80,000 first mortgage deb. stock issued by way of collateral security, but ranking in priority to £100,000 second mortgage debs. and trust deed dated July 31st, 1907. No trustees.

Efandem Co., Ltd.—Particulars of £12,000 debs., created September 1st, 1914, filed pursuant to Sec. 93 (3) of the Companies' (Consolidation) Act, 1908, the whole amount being now issued. Property charged: The company's undertaking and property, present and future, including uncalled capital. No trustees.

Brotherton Tubes and Conduits, Ltd.—Particulars of £13,000 debentures, created September 1914, filed pursuant to Sec. 93 (3) of the Companies' (Consolidation) Act, 1908, the whole amount being now issued. Property charged: The company's undertaking and property, present and future, including uncalled capital. No trustees.

Southern Brazil Electric Co., Ltd.—Trust deed dated August 19th, 1914, to secure £750,000 debentures, charged on (1) 19,900 shares out of a total issued capital of 20,000 shares in Companhia Campaniera de Traccao Luz e Forca; (2) 1,590 shares out of a total issued share capital of 1,600 shares in Emprez a de Melhoramentos Urbanos de Paranagua; (3) 70 per cent. of the issued capital of Banco Industrial Ampareuse; (4) all further shares in subsidiary companies to which the company shall subsequently become entitled; (5) certain concessions, lands, water rights and other immovable property in Brazil; and (6) the company's undertaking and assets, present and future. Trustees: Royal Exchange Assurance. 2 per cent. discount was made on the issue of 570,000 debentures and a brokerage 1 per cent. in cash and 2½ per cent. in fully paid shares was paid by the Parana Power Syndicate, Ltd., to brokers and other recognised agents in respect of debentures allotted on applications bearing their stamps.

British Arc Welding Co., Ltd. (108,759).—Return dated July 10th, 1914. Capital, £15,000 in £10 shares; 637 shares taken up; £4,370 paid; £2,000 considered as paid. Mortgages and charges: Nil.

British Continental Electricity Supply Co., Ltd. (57,088)—Return dated August 7th, 1914. Capital, £20,000 in 1,000 pref. and 1,000 ord shares of £10 each; all shares taken up; £16,400 paid; £3,600 considered as paid. Mortgages and charges: Nil.

MOVING PICTURES WITHOUT PHOTOGRAPHY.

By G. BASIL BARHAM, A.M.I.E.E.

Much has been said and written with regard to the extensive use that is made of electric signs by the American business man, and attention has often been drawn in the technical press to the fact that the sign industry has not developed in this country to anything like the extent it has in the United States.

Until a few years ago electric signs were comparatively rare in our big cities, and those in use were usually of the day and night type, consisting of gilded block letters, centred with carbon lamps from six inches to one foot apart. The lamps were usually under-run in order to economise current.

The first real fillip to the trade here was when the Underground Railways began to use signs in their corridors, and when they commenced to use them outside stations and for advertising purposes as well as for directions, the general public began to recognise their utility, and now quite a number of tradesmen have box signs of the continuous or intermittent light pattern. Many other forms of sign have been introduced such as the kaleidoscopic, and the sign with the rounded white opal glass letters and black metal-shaded portion that was advertised so extensively a few years ago, but none of them appear to have become popular in England, although they possess many good features, and certain of them have met with some favour on the Continent.

But it is in America that signs are principally used, and a study of some of the designs offered or an inspection of the signs fixed in any of their large towns would do more than half a dozen newspaper articles to show how backward we are in this form of advertising. And to be frank, one must admit that it is not the fault of the conservative English business man. The trouble is that the electrical trade seems to have nothing to offer him which is half-way between the humdrum advertising of the village sweetshop and the delirious delights of a Broadway get-rich-quick. The English trader will spend money freely for business purposes. He spends money on advertising schemes that are not nearly such good propositions as could be put up involving the use of electric signs. And he is not prejudiced against that form of advertising. He is in this position: he cannot tell the sign designer what kind of an advertisement he wants, for he does not know the possibilities of the electric sign. And the sign-maker is not prepared to go to him with a highly original scheme because he feels the business man dislikes spending money on electric signs. At present there is no doubt he does; few of the designs offered are worth spending money on. But the whole thing appears to be more or less of a misunderstanding, and with a little effort it is probable that the contractor, station engineer and sign-maker between them could easily remove what at present is nothing less than a reproach to the British electrical industry. A man will run his machines by electric motors, light his workshops with flame arcs, use metal filament lamps to light his retail stores and show off the goods he has to sell, and yet he does not use the finest advertising agent there is in the world to help him sell his goods, because—there is no one to tell him of its possibilities.

Perhaps the business man has led the maker to some extent in the United States. Here, only his own business is the concern of the trader; there, the trader is concerned with everyone's affairs. It is possible the business man saw that something could be done, and by insisting that his demands should be cared for, showed the American sign-maker that there was good business to be done and scared him into doing it. That this is so, is shown to some extent by the fact that in the earlier days of electric signs many American users kept them alight continuously throughout the twenty-four hours, the pioneer being, the writer believes, a seller of ready-made clothing, who fixed up a sign with 125 eight candlepower lamps in it and then objected to the expense of a main switch because he never intended to switch it off. His example was shortly afterwards followed by a big Brooklyn concern, which fitted up a giant sign with the name of the firm picked out in lamps and kept them burning day and night. In a short time the sign habit began to open up an almost untouched and highly profitable field for the electrician, and when the metal filament lamp became more reliable than it was when first introduced, specialist firms began to vie with each other in offering original and powerful advertising signs to the retailer and manufacturer, no less than to the music hall and picture theatre.

So far as the writer is aware, the nearest approach to the American moving picture signs in London is the "Drinking Scot" across the water, visible from

the Embankment, and the small snake which, advertising a certain brand of cigarette, appears more or less convincing according to the hour of the night at which it is seen. These have a certain merit, and may, let us hope, prove forerunners to a more extended use of this form of advertising.

The modern American moving picture advertisement is an electric sign in which a large number of lamps are used, and these are controlled by numerous switches so worked that the lamps represent horses, people, trains, aeroplanes and other objects in motion. The signs are of mammoth size, and the majority of them are distinguishable over half a mile away. That method of advertising is as popular with the public as with the business man, and every evening thousands of promenaders walk up and down, with what the American calls "rubbernecks," looking for something new and fresh in the sky-sign world.

One of the most interesting and typical of these signs was put up some time ago on an hotel in New York, and some idea of its size may be gained when it is mentioned that it rises to a height of seventy-two feet above the roof of the hotel and is ninety feet wide. Further, the sign was not merely a skeleton with steel wire netting and waterproof lamp holders; it was made with a solid background ninety by sixty feet in area, and to enable the sign to withstand the wind pressure over sixty tons of steel were used for foundations, frames, struts and bracings. In this particular sign are over twenty thousand electric lamps and the average load is six hundred horse power. In the wiring, over half a million feet of conductor were used and there are no fewer than seventy thousand separate electrical connections. The controlling board contains some two thousand seven hundred switches, and the moving picture effect is obtained by the switches being worked at a very high speed. It appears that a train of eight cars was required to haul this sign from the factory to New York, and electricians and other workmen were engaged on it, after delivery, for some three months before it was finally erected and at work.

The sign represented a Roman chariot race, the lines being picked out in white and coloured lamps, and around the arena three chariots were driven at full speed by galloping horses. The point of the advertisement, it may be mentioned in passing, was that the goods advertised were "Leaders of the World," and consequently the leading chariot is never overtaken. A striking effect is gained by making it appear that the spectator is moving with the foremost horses whilst the roadway, the arena wall and the stadium appear to move away, travelling past the drivers. A somewhat similar optical illusion has frequently been made use of on English stages in dramatic plays wherein railway trains or race-horses have been shown travelling at speed. The sign was most realistic; the manes and tails of the horses fluttered about, the clouds of dust rolled from the wheels and spurted at every step from beneath the hooves of the horses, and the clothes of the chariot drivers waved in the wind.

The whole effect is exactly as stated. To all intents it is that of a motion picture, but gained by the switching on and off of thousands of lamps. Above the arena is a space on which a description of the advertised goods appears in letters, electrically lighted, four feet in height. The waving tassels hanging from the curtain are over six feet high, and the first chariot wheel is eight feet in diameter.

It must be mentioned that the entire sign was not produced on one flat surface. In the background were the arena walls, and the two pursuing chariots were in front of them. Slightly in front of these was the first or ever-victorious chariot, as it may be termed, with the curtain in the foreground.

It has been mentioned that the motion effect is gained by causing the walls of the stadium apparently to move past the stage. The bodies of the horses and the chariots are therefore stationary and appear to move only because the arena appears to move in the opposite direction. The legs of the horses are outlined with electric lamps in eight positions and the switch which controls the lighting causes the lamps in these to flash in and out so rapidly that the eye cannot detect the change but, just as when seeing a bioscope film, follows the apparent movement. Lamps were provided in the manes and tails of the horses, and a waving effect was obtained by means of careful and studied switching on and off. The effect of moving dust was obtained in the same way and detail was studied to such an extent that even small tassels and ornaments on the harness of the horses were made to move in a similar manner.

It must not be supposed that the effect was wooden in any way or that the moving picture show was an inartistic repetition of a series of stilted leg movements and mechanical or, rather, electrical reiteration of waving tassels. The whole display was staggered and irregular movements to break the sequence were freely introduced. There was no rhythmic movement of the legs; on the contrary, the effect was as though the horses in the two following chariots were every now and then on the point of overtaking the leader, only to fall back a moment later, evidently exhausted with the effort.

The apparent movement of the roadway is produced by concealing controllable lights beneath sheets of opalescent glass correctly painted. These lights are in rows, branching out from a common centre near the leading chariot, and as these are successively switched on and off, the waves of light seem to be moving in the reverse direction to that in which the chariots are travelling. The wall of the arena was made to appear moving in a similar way, being illuminated by small bulbs which outlined the upper edge and the wreaths suspended from the top. A very ingenious method was adopted of lighting this wall face: rows of high candle-power tungsten lamps were placed behind the charioteer and their light concentrated by means of powerful reflectors on to one side of the wall. This naturally gave a high light there and as that, by contrast, reduced the light on the rest of the wall, it made the wall appear to be convex.

Very many examples might be given of the American moving-picture form of sign. One which comes to mind represents a very tall and business-like lady hurrying along a street with a raised umbrella and holding her skirts with one hand. The wind effect is very fine and the impression of storm and rain is cleverly conveyed. Seaside resorts advertise in like manner, only in their advertisements the weather is always luridly sunny. One of these may be described, as being typical of all; in it is a sunny beach on which waves, produced in the same way as the clouds of dust in the chariot race, are breaking merrily; another is a morning scene with rising sun and a gradually awaking town. A more elaborate design shows gaily-clad bathers moving about the beach and entering and leaving the water, and another worthy of mention shows a watering place by moonlight, with pleasure-seekers returning from the promenade and entering the hotels and cottages, which are glittering with light.

There is no need to place more emphasis on the vast difference which exists between English and American electric sign practice. There it is a live business, growing so rapidly that one wonders to what stage of development it will ultimately reach. Here in England—well, apparently we only know how to light up boxes with block letters cut in them, behind which we have painstakingly learned to stick fragments of coloured and crinkled glass. The maker would probably say that is what the English business man wants. In my opinion it is what the English business-man has to put up with!

CITY NOTES.

Automatic Telephones (Australia), Ltd.

According to a Sydney newspaper, this company held its meeting on August 5th. The matter was mentioned in our last issue.

The Chairman (Mr. J. B. Nicholson) stated that contracts were in hand which would keep the company busy for at least six months, and possibly 12. He did not know how the war would affect the business, but he had not much fear regarding it. The company had tenders extending over a number of exchanges. In Victoria and South Australia the position was that competitors of the company had been given a couple of small contracts. Geelong and Brighton exchanges in Victoria were under the company's system, and the question was whether the department in Melbourne would mix up the systems or stick to the one which had proved its worth. There would be a very small saving financially, and, in addition, the other systems were only in an experimental stage—they could not be introduced solely into any big city. The freedom from trouble on the company's system was largely due to the efficient staff of engineers. Mr. Nicholson recently made a contract in Chicago for a supply of instruments which had yet nine years to run.

Canadian General Electric Co., Ltd.—The directors have declared a quarterly dividend of 1¾ per cent. for the three months ending September 30th, being at the rate of 7 per cent. per annum on the common stock, and a half-yearly dividend of 3½ per cent. for six months ending September 30th, being at the rate of 7 per cent. per annum, has also been declared on the preference stock, payable October 1st.

Spain.—La Industria Electrogalvanica is the title of a share company formed at Barcelona with a capital of 75,000 pesetas, with the object of restoring and polishing metals by means of galvanisation and for other objects.

With the title of Instalaciones Generales de Electricidad, another company has been formed, also at Barcelona, with a capital of 25,000 pesetas, to carry out electric installations and similar work.

United Electric Car Co., Ltd.—The annual general meeting was held at Preston, on September 17th. Mr. Shorrock voiced a feeling of great satisfaction at the declaration of the dividend on the ordinary shares in view of the present state of affairs.

Japan.—During the seven months ending with July last, a total of £2,358,500 was invested in the electrical and electricity supply industries in Japan; of this sum only £225,000 was in respect of new concerns, the remainder (£2,133,500) being for the extension of old undertakings.

Madras Electric Tramways (1904), Ltd.—The directors have declared an interim dividend on the 6 per cent. cumulative preference shares, payable on 30th inst.

Shawinigan Water and Power Co.—For the quarter ending September 30th a dividend of 1½ per cent. has been declared.

STOCKS AND SHARES.

Tuesday Evening.

The prolonged battle has had a somewhat subduing effect upon Stock Exchange business. Until definite indications are forthcoming, Stock Exchange members, and the public generally, determine to wait before embarking upon new engagements. Naturally, in the suspense, confident and quiet though it has been, the tendency was for gilt-edged prices to give way a little here and there. Consols, for example, dwindled to 68½, below which price Stock Exchange members are not at present allowed to deal amongst themselves. To this extent the market marched to a deadlock; and since Consols are now the recognised leader for all prices in Stock Exchange securities, the rest of the quotations inclined to quietude.

Where the public score through the Stock Exchange being closed is in the fact that, should the news be negative, or not so satisfactory as could be wished, House men can shut up their books and go home without any of that feeling of compulsion which chains them to the markets when the House is open. In this way, any kind of slump is practically impossible, for the markets merely melt away, and prices cannot go down if there is nobody offering stock. The public, of course, are prejudiced by the lack of dealing facilities, but this is much more than compensated by the absence of depreciation in securities which the same set of conditions brings about. The man who grumbles because he cannot realise, say, £100 British Westinghouse Preference shares, may have a personal grievance against the Stock Exchange, but the cause which prevents his raising the money at the same time saves probable depreciation of thousands of other stocks and shares where interests infinitely wider are concerned.

The decision of the Government to recompense Home Railway companies for the carriage of troops, up to the extent of the traffics for the corresponding period last year, continues to exert a steadying influence over prices. Material recoveries have occurred. There are many buyers about for small sums of Underground Electric 6 per cent. Income bonds, now quoted *ex* £3 interest. Up to 80 *ex* dividend has been bid, this price comparing with 83, *cum* dividend, on July 30th. The shilling shares are quoted at 5s., at which they look a much more reasonable proposition than they did when the price was two-and-a-half times as much, and when, we venture to recall, the opinion was expressed here that the value was inflated, in spite of the noticeably unanimous conclusion in certain financial columns that the shares made a good purchase.

Metropolitan Consolidated at 31½, and Districts at 19, have recovered to the same prices at which they stood when the Stock Exchange closed. No changes have occurred from the figures quoted here last week for the prior-charge stocks.

It is a little surprising that attention should not be paid to the claims of electric lighting companies' shares at the present time. It is not that sellers abound, but rather that buyers are absent, which keeps prices dull. The companies are known to be doing well, on the whole; better, in fact, in some cases than at this period of the year in normal times. Public interest, however, is not yet awake to the possibilities offered by the electric share market, though special constables have been heard to discuss their possible merits as the men meet on their beats and watch the electric beams that play from the various quarters of the sky over the metropolis.

In the Telegraph market something like a comprehensive list of quotations has developed, and we append prices of the leading Telegraph and Telephone issues, with a column showing the figures at which the stocks and shares stood at the end of July. It is worth mentioning that buyers can probably be accommodated at prices very near the lower of the two given in the first set of prices, though this does not apply in every case. Western Telegraphs constitute one of the exceptions, there being several buyers about at 12⅞.

Stock or share.	Present price.	July 30th.	Fall.
Anglo-American Tel. 6 per cent. Preferred	105 — 7	108	2
" " Deferred	22 — ¼	22⅝	⅜
Chile Telephones	6¾ — 7¼	7⅞	⅝
Commercial Cable 4 per cent. Deb.	79 — 81	81	1
Constantinople Telephone Ord.	4 — ½	4½	—
" 6 per cent. Oblig. Bonds	98 —100	101	2
Cuba Sub. Tel. Ord.	8 — 9	8⅜	—
" " 10 per cent. Preferred	15½— 16½	16⅝	⅛
Direct United States Cable	6 — ⅛	6⅛	⅛
Eastern Extension Tel. Ord.	12 — ¼	12⅜	⅛
" " " 4 per cent. Deb.	94 — 6	97	3
" Tel. Ord.	127 — 30	130½	2
" " 3½ per cent. Pref.	76 — 8	77½	½
" " 4 per cent. Deb.	96 — 8	97	—
Globe Tel. and Trust Ord.	10¾— 11½	11½	¼
" " 6 per cent. Pref.	12 — ½	12½	⅛
Great Northern Tels.	30 — 2	32	1
Indo-European Tels.	57 — 9	58½	½
New York Tel. 4½ per cent. Int. Bonds	95 — 7	99	3
Oriental Telephone Ord.	2 — ⅛	2 1/16	1/16
" " 6 per cent. Pref.	1 — ⅛	1 1/16	1/16
" " 4 per cent. Deb.	85 — 7	87	1
Telephone Co. of Egypt 4½ per cent. Deb.	96 — 8	98	—
United River Plate Tel. Ord.	5⅞— 6¼	6⅜	⅛
" " " " 5 per cent. Pref.	4⅞— 5⅛	5¼	⅛
" " " " 4½ per cent. Deb.	95 — 97	99	3
West India and Panama Ord.	⅞— 1⅛	1⅛	1/16
Western Tels.	12⅝— 13⅛	13⅜	⅛
" " 4 per cent. Deb.	95 — 7	96½	2

Amongst the shares for which there has lately been more inquiry are Marconis. The Government is partially working the company's lines, but it is understood that all the Marconi stations are extremely busy just now. At the same time, there is a heavy bull account in the market. This notwithstanding, the price has risen to 30s. Americans are 8s. 6d., and Canadas 4s. 6d. Cable companies, on the whole, are making up for their loss of traffic on the one hand by the fact that so many messages have to go now in plain words. A reduction in charges has been notified this week, but, allowing for this, there should be a useful margin of extra profit to compensate the decrease in ordinary cabling consequent upon the war.

The Electric Manufacturing section is somewhat dull, and in the case of the majority of shares the demand has not overtaken the supply. Prices are not called much lower than they were on July 30th, but those who want to pick up cheap shares would probably be able to do so by putting forward bids. Edison & Swan £3 shares have been changing hands between 2s. 6d. and 3s. In other sections, North Metropolitan Preference was dealt in at 108½, and London Debenture at 89. A good-sized line of Winnipeg Electric Railway 4½ per cent. Debenture stock was bought the other day at 93½. Anglo-Argentine Tramways 4 per cent. Debenture has risen to 86. Brazil Tractions keep very steady between 49 and 50. British Westinghouse Preference are said to be in the neighbourhood of 26s., but it is difficult to get a reliable price in them. Babcock & Wilcox have been offered in a small way at 2 1/16, which looks low compared with 2¾ two months back. Vickers are up to 33s. 6d., which, allowing for the dividend of 1s. recently deducted, leaves the price unaltered since July 30th. Rubber shares strengthened in several cases. The raw material is about 2s. 0½d. per lb. in London and 4s. per lb. in Amsterdam, the apparent anomaly being due to the fact that sales of rubber are not allowed from England to Holland, because of the war with Germany.

EXPORTS AND IMPORTS OF ELECTRICAL GOODS DURING AUGUST, 1914.

The returns of electrical export and import business for August naturally reflect the unsettled trade conditions brought about by the present European war, and while our overseas electrical business reached less than half of the value recorded for July, the imports fell to about a third of the corresponding value for July.

The export total for the month amounted to £238,621, as compared with £564,291 in the previous month, and the falling off is fairly generally spread over all sections, although, of course, most marked in such matters as machinery, cables, &c.

As regards the imports, the August total of £87,031 compares with £291,244 in July, while the re-export total was practically £10,000, or about half that of the previous month.

A great decline in electrical imports was the inevitable and not wholly unwelcome sequel to a war with Germany, and it is not surprising that her total of £168,000 in July should have fallen to £24,953 in August—still a very large share of the imports for the month. Another result of the war is the sudden increase of Dutch imports, this neutral (?) country's share of business being valued at £7,736 in August as against only £1,120 in July. The falling-off in business is apparent in all directions, and it is satisfactory that, as regards our own trade, this has not been more dislocated by the uncertainties of the past month.

Registered Exports of British and Irish Electrical Goods from the United Kingdom.

Destination of exports and country consigning imports.	Electrical goods and appliances.	Wires and cables rubber and other insulations.	Electric lighting fittings and accessories.	Electric glow lamps.	Electric arc lamps and lamp parts.	Electric meters and instruments.	Electric machinery.	Electrically-driven machinery.	Batteries and accumulators.	Carbons.	Telephonic cable and apparatus and electric bells.	Telegraphic cable and apparatus.	Total
	£	£	£	£	£	£	£	£	£	£	£	£	£
Russia, Sweden, Norway and Denmark ...	843	248	...	10	...	336	3,616	39	40	31	...	849	6,012
Germany	3,912	120	63	...	48	92	1,280	127	14	112	...	...	5,768
Netherlands, Java and Dutch Indies ...	...	12	112	10	30	32	978	15	185	112	889	31	2,406
Belgium	1,054	110	58	...	2,657	20	420	...	...	41	508	...	4,868
France	221	...	1,064	...	45	171	3,664	44	15	37	273	437	5,971
Portugal	...	85	...	11	...	...	136	20	...	...	989	...	1,241
Spain, Canary Isles and Spanish N. Africa...	1,165	...	53	67	52	403	1,035	520	108	7	...	11	3,421
Switzerland, Italy and Austria-Hungary ...	33	62	...	...	...	...	1,396	...	...	183	...	605	2,279
Greece, Roumania, Turkey and Bulgaria ...	41	73	26	...	...	...	1,283	51	...	...	750	2,648	4,872
Channel Isles, Gibraltar, Malta and Cyprus...	39	99	8	37	...	...	...	...	21	...	7	34	245
U.S.A., Philippines and Cuba	40	456	...	...	...	...	498	50	340	...	...	92	1,476
Canada and Newfoundland	270	1,564	1,434	991	35	116	8,180	...	1,706	...	547	117	14,960
British West Indies and British Guiana ...	40	...	5	31	...	30	...	...	59	...	9	3	177
Mexico and Central America	...	...	...	...	...	25	29	228	...	...	...	...	282
Peru and Uruguay	...	114	10	...	...	...	587	27	21	...	113	51	923
Chile	116	161	14	12	...	104	339	...	327	...	30	436	1,539
Brazil	135	...	275	...	...	...	113	...	22	...	302	10	857
Argentina	2,445	10,091	250	802	262	1,433	11,800	4,256	2,645	164	2,357	764	37,269
Colombia, Venezuela, Ecuador and Bolivia...	61	...	...	...	...	...	278	...	...	...	...	998	1,337
Egypt, Tunis and Morocco	36	392	15	33	300	65	413	113	118	4	113	52	1,654
British West Africa	186	74	18	18	...	68	125	...	...	...	190	14	693
Rhodesia, O.R.C. and Transvaal	1,734	2,942	211	179	51	15	2,028	30	263	...	...	...	7,453
Cape of Good Hope	1,921	639	154	103	125	185	2,205	849	118	21	260	371	6,951
Natal	543	1,365	109	...	15	...	658	...	33	18	4	155	2,900
Zanzibar, Brit. E. Africa, Mauritius & Aden	469	136	56	321	...	73	294	184	16	...	...	547	2,096
Azores, Madeira and Portuguese Africa ...	...	...	...	...	...	...	...	...	...	...	...	...	...
French African Colonies and Madagascar...	...	...	...	...	...	...	...	...	...	...	...	...	...
China and Siam	1,641	251	288	11	...	368	1,280	...	280	146	594	519	5,378
Japan and Korea	50	...	69	...	...	292	6,376	...	...	20	201	1,584	8,592
India	3,964	7,261	1,282	372	32	950	14,948	5,982	1,323	184	3,765	152	40,215
Ceylon	82	105	70	93	...	14	339	...	13	...	194	...	910
Straits Settlements, Fed. Malay States and Sarawak	297	464	218	19	137	209	3,358	311	109	10	264	322	5,718
Hong Kong	481	2,568	122	37	51	328	3,638	...	66	...	...	44	7,335
West Australia	618	3,733	58	35	...	5	165	...	321	...	111	...	5,046
South Australia	393	587	195	17	...	26	1,725	...	...	...	459	...	3,402
Victoria	1,729	4,649	356	253	105	345	4,735	...	229	14	1,105	258	13,778
New South Wales	1,163	4,717	202	1,089	89	200	3,968	925	742	41	631	388	14,155
Queensland	42	838	67	397	...	277	1,583	...	68	12	1,125	453	4,862
Tasmania	162	...	...	16	...	...	81	...	...	...	...	12	271
New Zealand and Fiji Islands	1,484	2,293	869	1,177	273	450	3,238	488	550	11	134	342	11,309
Total, £	27,410	46,209	7,731	6,141	4,307	6,632	86,789	14,259	9,752	1,168	15,924	12,299	238,621

Registered Imports into the United Kingdom of Electrical Goods from all Countries.

Russia, Norway, Sweden and Denmark ...	15	...	...	...	45	621	1,554	...	354	250	1,498	4,337
Germany	913	3,011	512	2,454	2,390	312	11,729	...	1,058	721	1,853	24,953
Holland...	...	...	...	3,821	3,816	...	17	10	72	...	...	7,736
Belgium	68	847	...	50	10	12	987	320	...	...	1,461	3,755
France	284	...	846	116	305	8	711	...	...	659	279	3,208
Switzerland	280	...	...	...	...	57	693	...	...	...	...	1,030
Italy	...	1,040	...	...	10	...	394	...	...	...	180	1,624
Austria-Hungary	...	...	...	...	...	...	665	...	...	...	...	665
United States	3,099	...	717	290	69	65	12,402	20,124	1,323	1,036	301	39,426
Total, £	4,659	4,898	2,075	6,731	6,645	1,075	29,152	20,454	2,807	2,666	5,572	86,734

Additional imports: Spain: carbons, £52. Canada: Goods, £105; machinery, £60; telegraph apparatus, £80.

Registered Re-Exports of Foreign and Colonial Electrical Goods from the United Kingdom.

Various countries, mainly as above... ...	2,479	89	...	1,867	271	...	2,475	...	227	503	2,090	10,001

TOTAL EXPORTS: £238,621 TOTAL RE-EXPORTS: £10,001 TOTAL IMPORTS: £87,031

NOTE.—The amounts appearing under the several headings are classified according to the Customs returns. The first and third column contains many amounts relating to "goods" otherwise unclassified, the latter, doubtless, consisting of similar materials to those appearing in adjacent columns. Imports are credited to the country whence consigned, which is not necessarily the country of origin.

ELECTRIC WINDING PLANT AT BURLEY COLLIERY.

An interesting colliery electrical plant is to be found at Apedale, where the Midland Coal, Coke & Iron Co., Ltd., make extensive use of electrical power generated from waste gases. The power house for this purpose contains three 375-kw. Witton alternators driven by National gas engines, and generating three-phase power at 550 volts, 25 cycles. A view of the three gas-driven sets is given in fig. 1, whilst

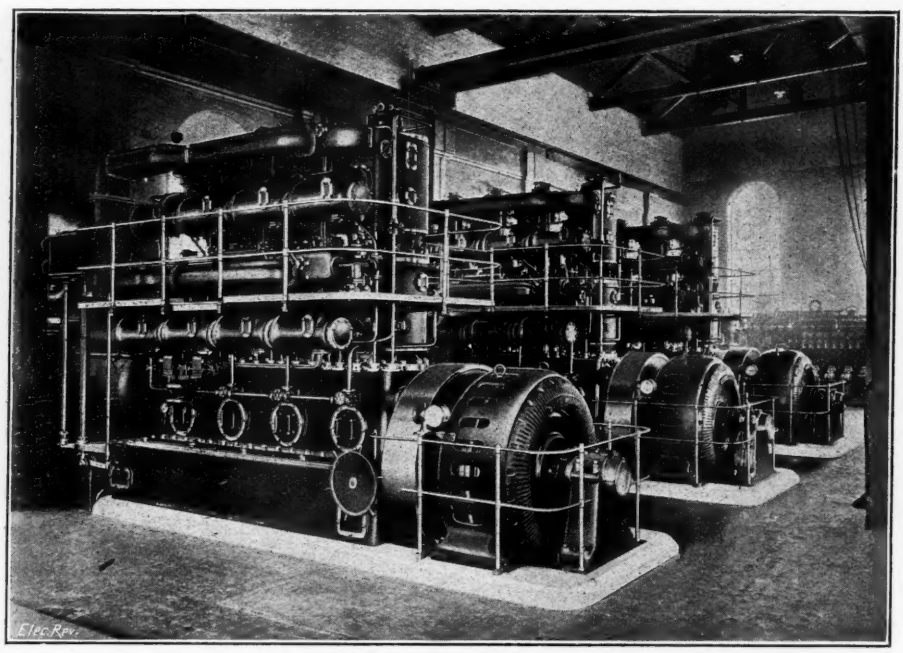


Fig. 1.—Power House at Apedale Iron Works of the Midland Coal, Coke and Iron Co. showing National Gas Engines driving G.E.C. Witton Alternators.

the Witton switchboard and a 150-kw. steam-driven Witton generator is shown in fig. 2.

The three gas engines are of the four-crank eight-cylinder vertical tandem enclosed type, provided with forced lubrication to all bearings, and running at a constant speed of 300 r.p.m. with a rated load of 600 b.h.p. The gas for the engines is obtained from the colliery coke ovens, and purified in outside scrubbers, being subsequently stored in a gas holder of 20,000 cb. ft. capacity. It may be noted that three further gas engines are on order with the National Gas Engine Co., for this plant, suitable for working on the blast furnace gas, one of these to be direct coupled to another Witton alternator, and the other two to reciprocating blowers, by Messrs. Alley & McLellan, for the blast furnaces.

Amongst motor-driven plant, perhaps the most interesting is the electrically-operated winder, which has been constructed by the General Electric Co., Ltd.

This winder is situated at the Burley Pit, the company being about to close down their Sladderhill Pit as far as coal winding is concerned, the coal from which will be brought up by way of the up-cast shaft of the Burley Pit. The winding drum is of the double-cone type, rising from 7 ft. in diameter to 13 ft., and being 11 ft. 8 in. wide over the flanges; it is mounted on a 9-in. diameter shaft carried in three bearings 8 in. diameter and 12 in. long. The drum is grooved to take a rope $1\frac{1}{8}$ in. in diameter.

A special feature of this winding plant is the brakes, which are of the double-post type, lined with wood blocks and arranged to be operated by a foot lever during normal working. For emergencies a vertical lever fitted with the usual over-winding attachment operates a trip gear, which releases a weighted lever controlled by a dashpot, and so applies the emergency brake. The failure of the electric supply will also bring into operation a solenoid, which will apply the brake and, in addition, a hand lever is provided by which the operator can apply the brake should the necessity arise. Naturally, the trip lever in operating cuts out the motor by means of an emergency switch. To replace the emergency brake after an application a small hand-wheel is provided on the driver's platform.

The winding drum is driven by a 145-b.h.p. Witton motor (continuous rating) specially designed for heavy overloads. This motor runs at 140 r.p.m., and is geared to the drum-shaft through reduction gear, supplied by the Power Plant Co., running in an oil bath and giving a drum-speed of 39 r.p.m. The depth of the shaft operated by the winder is 458 yards, and a gross load of 30 cwt., or alternatively 12 men, is raised in 80 seconds. As will be seen from the power-time diagram in fig. 5, the winding speed varies from 1,030 to 1,450 ft. per minute, the h.p. at the end of the accelerating period —12·25 seconds after starting — being 179, which falls during the running period to 86 h.p. The retarding period is equal to the accelerating period.

Special interest is attached to the construction of the controller, which involves an entirely new principle. One of the first points of importance is that it is completely mistake-proof, and that the operator cannot inadvertently accelerate or retard at any other than a predetermined rate. It will be remembered that one of the principles on which many winding controllers have been constructed is that of an electrolyte flowing over a weir, the electrodes being situated in the electrolyte, the level of which is varied by raising or lower-

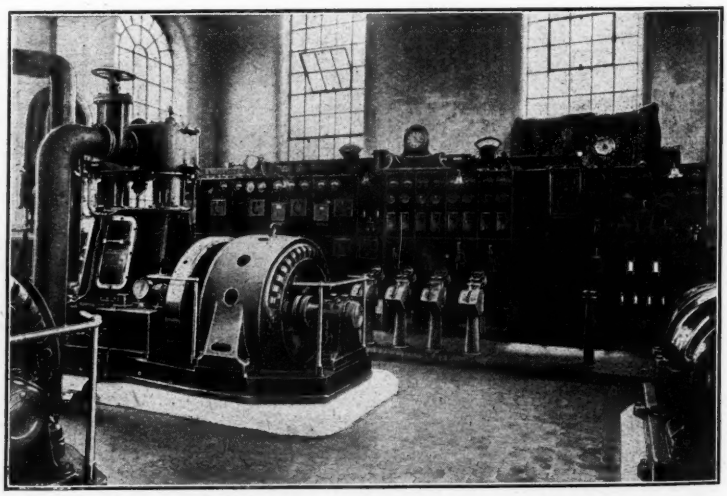


Fig. 2.—View showing the Switchboard and 150-kw. Steam-Driven Witton Alternator in the same Power Station.

ing the position of the weir. In this way the speed of the motor is controlled. This method has a number of disadvantages; for instance, the pump has to circulate an electrolyte containing chemicals which cause trouble in the pump, the electrolyte, of course, being hot. In the controller used at the Burley Colliery the principle of a relay is introduced. The resistance is cut out of the rotor circuit by the downward motion of three movable electrodes connected together to form the star point of the circuit, and these dippers are attached by a chain running over pulleys to a float in an entirely separate tank. When the float rises the dippers are lowered and cut out the resistance,

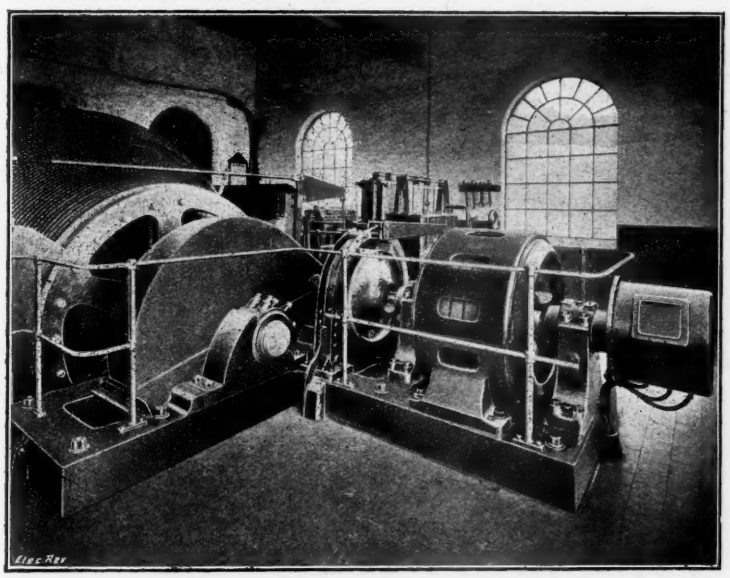


Fig. 3.—Electric Winder at Burley Colliery.

their movements in this way being delicately controlled. The float tank is constructed in two portions, an inner and an outer tank, water being kept constantly in circulation from the outer to the inner one by means of a small motor-driven centrifugal pump. This water constantly flows from the inner tank unless the valve is closed by the control lever, when the level of the water rises at the predetermined rate, carrying with it the float, which thus lowers the dipper blades in the control tank and runs the motor up to the predetermined speed.

The speed to which the motor accelerates is controlled by the position of a shutter forming one side of the inner tank, this shutter being itself controlled by a separate lever, which can, if desired, be placed permanently in any position, or, alternately, can be used during each wind. If this second lever be put to the slow position, the motor will accelerate to the slow speed when the main control lever which is normally used by the driver is put either in the forward or the reverse position. On the other hand, if the regulating lever is pushed into the "full on" position the motor runs up to full speed when the main lever is put over.

There are, of course, two motor switches, one for each direction of running, and these are so interlocked that they cannot both be put on at the same time. The rotor connections accommodate the fixed terminals in the starter tank.

The main operating lever is of the usual type, and actuates both the reversing switches and the valve in the control tank.

An additional feature is a special device preventing the stator switches being left partially in contact. This device also prevents the driver inching by rapidly switching on or off. There are three notches only for this lever, an "off" and a "full-on" position for either direction. The regulating lever is situated outside the main control lever, and has a number of notches representing different speeds; it can be set either for "full" or for any fraction of full speed.

It will be seen that the winding gear is fully equipped with safety devices to cope with every contingency. There is a depth indicator of the vertical type driven from the drum-shaft, and provided with an overwinding attachment which cuts off current and releases a weighted brake when the cages pass a predetermined point. That the brakes may not be too suddenly applied, the brake lever is fitted with a dash-pot. In addition to the overwinding device, an over-speed gear of the high-speed Hartnell governor type is also provided, and controls the speed of the cage at every point in the shaft. Should the driver fail to effect the necessary reduction in speed when nearing the end of the wind, the over-speed device, which is set to operate on a 5 per cent. speed increase, opens the motor-circuit and applies the weighted brake lever. The features of this system of control may be summarised as follows:—

1. For winding coal the regulating lever can be left permanently in the full position.
2. For winding men the regulating lever can be used for bringing the cage up to speed more slowly, and to moderate the speed down if required.
3. It can be similarly used for inching or examining the ropes.
4. The pump only deals with fresh clean water, and not with the electrolyte, as in some forms of controller.
5. The water with which the pump deals is cold, the energy dissipated in starting the motor not being absorbed in it.
6. It is impossible to make any partial contact on the stator switch, thus the driver cannot damage the contacts of the switch when inching.

Naturally, points 4 and 5 make for improved running and low maintenance of the pump.

A raised platform is provided for the engineman, upon which all the levers are conveniently placed. A visual and oral signal of the electrically-operated dial type is installed.

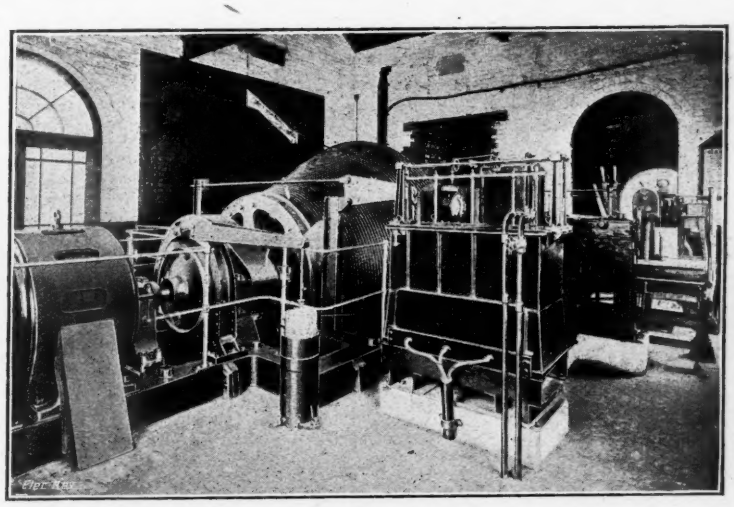


Fig. 4.—General view of the Winder, showing the Controller. The Driver's Platform is seen in the rear, and in the foreground the Dashpot for the Brake.

The power cost of raising coal from the full depth of the shaft by this gear is 0·5d. per ton.

The electrical equipment of the winder was supplied by the General Electric Co., Ltd., Messrs. M. B

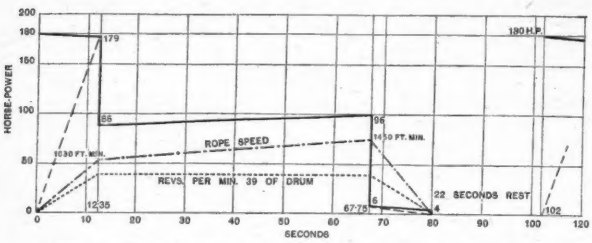


FIG. 5.—POWER-TIME DIAGRAM OF ELECTRIC WINDER.

Wild & Co., Ltd., being responsible for the mechanical portion.

TRADE WAR.

BY "IGNOTUS."

Now in those days there dwelt in The Island a great nation, waxed fat with the spoil of olden wars, and long years of prosperity. Withal, as ever has been, were there many wretched, who lacked bread, while their rulers rode in chariots.

But there arose certain soothsayers, bald heads, searching out hidden things, who discovered vast treasure, that lay deep here and there in the land, and could be won for the digging.

So they approached with humility divers rulers and rich lords, saying: "Behold, we wot of treasure in this place, and that; do you command the needy into armies of workers who shall dig at your guidance; so there shall be profit for you and bread for these starving ones and their children." But they were laughed to scorn; one saying "I have skill with rods of wood to strike a ball so that it drive one hundred and ninety and nine cubits; shall I waste my dexterity in digging?" And another answered saying: "Thou seest I am busy; come again therefore after many moons." Quoth another, haughtily: "Am I not known of all men as the Maker of Pills, daily with Kings eating delicacies from golden platters? Begone, lest my slaves chastise thee." And another said: "I am cunning in uttering terminological inexactitudes in the Forum and receive four hundred pieces of gold each year therefor; but digging is sore labour; am I then a fool in your eyes?" And one mocked them, saying: "I have such wealth of my father, the soap boiler, that truly I know not how to dispense it, even with the help of many maidens. As for these witless ones of whom ye prate, enquire of them wherefor they selected not their parents with a greater discretion." And another placed his forefinger beside his nasal protuberance, saying: "How many thrifty are in the land, who have hoarded shekels in pots! Well I wot how a prospectus artfully contrived will freely draw unto me their coins. And when at the meeting I shall say unto them, 'Through this and that, all is lost, despite my sleepless labours,' bear me witness that they will but say, 'Alas! Alas!' and return to their hoarding as before. Having already treasures unlimited at call, shall I also dig? Go to; thou weariest me."

In short, with one accord they drove away the soothsayers, treating them with contumely.

And it came to pass in those days that certain philosophers of renown came from afar off, and sojourned in The Island. They, hearing of the buried treasure, spoke with the soothsayers in the market place, saying: "Tell us of this treasure." So they told them.

Then they addressed the multitude, saying: "Hearken unto us, ye slaves and hungry, that ye may eat, and your children with you. In such and such a place shall ye dig, as we shall direct you, and much gold shall be brought to light. But heavily must ye labour to reach it, and in the meantime ye are faint, and your little ones cry out. Therefore, will we bargain with our friends in our own country; who, though they be but barbarians knowing not your speech, have flocks and herds and much strange money; yet desire more. These aliens, trusting us, shall lend us great sums, that we may eat and drink until our labour brings reward. And we will make certain bonds with them, so that when the treasure is won, such and such part thereof shall be paid to them in usury; and such and such part shall be ours; and the remainder ye shall divide between you for your labour; that all may be contented, and have abundance."

Then all who heard these words were astonied, saying: "It is good; let us do as these mad foreigners say; for our bellies are empty now, and our last state can scarce be worse than our first." And it was so.

Now after many days the treasure was plain to all men; and the philosophers and their friends gat much gain, for the bonds were light. And the slaves waxed fat unto truculence; having many children, and motor-bikes.

So all men blessed the philosophers, calling their leader "That Great One"; naming them Presidents of the Council, and erecting graven images in their honour.

Then were those rich men who had abused the soothsayers very wroth; for wags met them in the gate mocking them, and saying "We told you so"; though truly they lied in their throats.

And they communed with the Slide-rule Shifters, and their henchmen, in inner Chambers, saying: Can we endure all this?" And there was gnashing of teeth.

Now at that time there dwelt in the chief cities certain drummers from a land on the further side of the Pond; loquacious ones, speaking through the nose, and the hat, and worshipping, very faithfully, a powerful god named Bluff. And these subtle ones, scenting prey, brought the disgruntled rulers and merchants together privily in a certain place, saying unto them: "Behold these pretended philosophers, who were doubtless cast out from their barbarous country for their many crimes! What are they but alien thieves and foreign plunderers, knowing no shame? Have they not stolen the treasure that is yours of right?—seeing that it is in your own country, and was known even of your own soothsayers ere ever they adventured here to your undoing. Now therefore let us slay them and seize their riches, and constrain their servants to toil for us, so that we can eat the bread of luxury all our days."

But one crafty one said, "If one of us alone should slay them, all the people will clamour saying, 'Thou robber' and 'Thou murderer,' giving him no peace. Therefore let us all swear by the Five Sacred Letters that each shall stab in the back secretly, so that each may declare to the multitude, 'Not by my hand! Not mine!' And further, let us each with one accord loudly call the other 'Patriot' in the hearing of the ignorant; and the people's wrath shall shortly be appeased."

And this counsel seemed good to many that were eaters of fire. But others doubted exceedingly; men of judgment, who had striven in battles when those hot-heads had scarce cut their eye teeth, saying "This is folly; wot ye not these strangers' little game? Surely ye shall be guilty in vain, at best exchanging only one gang of robbers for another." But the Lords of the Lacquerers of Brass, and the Squirters of Tungsten, heeded them not.

For it was written of old: "The thoughts of the diligent tend only to plenteousness, and riches and honour are with them; but who is able to stand before envy?"

SCHRAGE PATENT THREE-PHASE COMMUTATOR MOTOR WITH SHUNT REGULATION BY BRUSH DISPLACEMENT.

DURING recent years stationary three-phase commutator motors have been employed extensively in textile, hoisting and winding, machine tool and ventilating services, &c. Series motors offer the advantage of simple regulation by brush displacement, but shunt machines are frequently preferable in other respects, owing to the wide speed variation of series machines with load and voltage fluctuations. On the other hand, commutating motors with shunt regulation have hitherto involved complex and costly controllers, comparing unfavourably with the simple brush control possible in series motors.

The Arnold-La Cour single-phase motor with cross winding is a commutator motor with shunt regulation. The controller required is naturally simpler than that required for three-phase current, but the machine is regulable only within comparatively narrow limits. Three-phase shunt commutator motors (as made by the A.E.G., and the Allmänna Svenska E.A.) offer the advantage of wider speed regulation.

Fig. 1 shows the connections of the Allmänna Svenska-La Cour motors as built since 1907. P represents the stator primary winding, R the stator regulating winding, and S the rotor winding

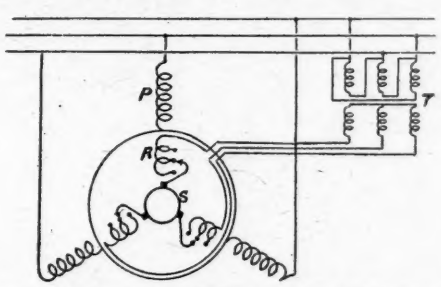


FIG. 1.—ALLMANNA SVENSKA-LA COUR WINDING FOR VARIABLE-SPEED THREE-PHASE MOTOR.

(a D.C. winding with commutator). Regulation is effected by varying the voltage applied to the rotor from R, and T represents a small transformer which supplies to S the E.M.F. required for brush rockers oppositely and by equal amounts (so that the axis of symmetry of the effective part of the regulating winding remains coincident with that of the stator phases), an E.M.F. is supplied to the secondary winding, which varies with the regulating turns between the *a* and *b* brushes. The motor speed then rises above or falls below synchronism. The light-load speed of the machine is given by $n = 60\ c/p \times (w_2 \pm w_3)/w_2$ (where c = frequency; p = pairs of poles; w_2, w_3 = effective secondary and regulating turns respectively). The same formula is applicable to the La Cour motor (fig. 1), but whereas the frequency of the brush current is the line frequency in the latter case, it equals only the frequency of slip in the Schrage motor. Commutating conditions are, therefore, very different in the two cases.

Characteristics.—A Heyland circle diagram can be drawn corresponding to each brush setting. The conditions are more complex than in an ordinary induction motor, but, making certain permissible assumptions, it is possible to derive an equation for the circle diagram which agrees well with experimental results (see *Elektrotechnische Zeitschrift*, pp. 89-93, 1914).

TABLE I.—SYMMETRICAL BRUSH DISPLACEMENT.

11/3·7 KW., 200 V., 50 cycles, 1,500/500 R.P.M. Schrage motor.

Brush position.	Output, H.P.	Speed, R.P.M.	Power factor.
I	2½	1,580	0·6
	7½	1,540	0·87
	15	1,475	0·94
II	2½	980	0·55
	7½	940	0·81
	15	870	0·85
III	2½	550	0·52
	7½	350	0·7
	15	—	—

Table I shows the speed and power factor of an 11/3·7 KW., 1,500/500 R.P.M. (synchronous speed 1,000 R.P.M.), Schrage motor as a function of output for various brush settings. Very high power factor is obtained above synchronism, but at 500 R.P.M. the power factor falls to 0·65, assuming symmetrical brush displacement. If one brush rocker be displaced more than the other so that the axis of the regulating winding is displaced from that of the secondary winding (oppositely to the direction of rotation) at low speeds, much better power factor is obtained in the latter case, as shown by Table II, which refers to a 66/22 KW., 220 V., 50-cycle, 720/240 R.P.M. machine. By a suitable (complex) brush shifting device, it is possible to obtain unity power factor at full torque on each speed.

Asymmetric brush displacement improves the overload capacity as well as the power factor at low speeds, hence these motors

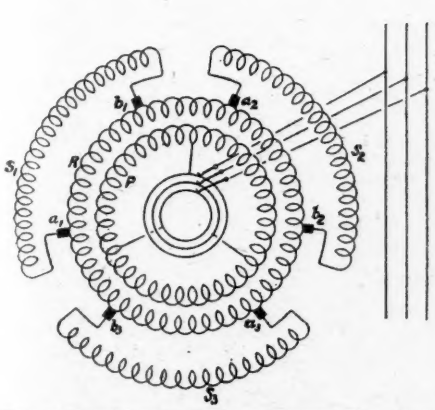


FIG. 2.—WINDING OF SCHRAGE PATENT VARIABLE SPEED THREE-PHASE MOTOR.

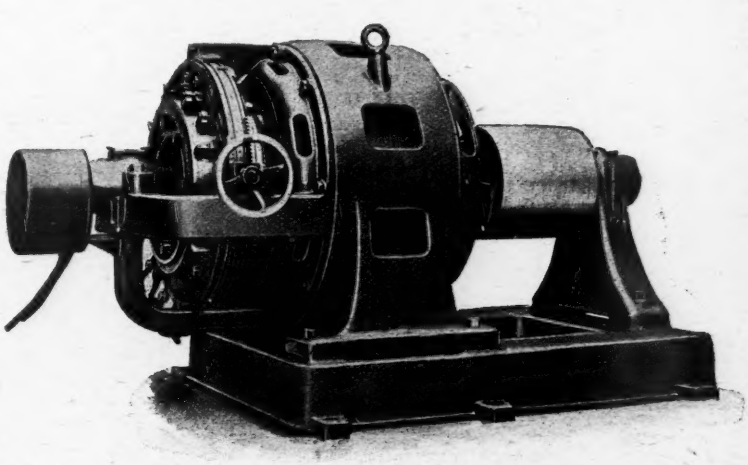


FIG. 3.—SCHRAGE MOTOR OF 37/9·2 KW. AT 220 VOLTS, 50 CYCLES, 800/200 R.P.M.

phase compensation. These motors are available with 1 : 4 speed range, but have hitherto found little application owing to their high prime cost; the controller is costly and complicated, particularly for wide speed range and fine regulation. The rotor pressure being low, the current is correspondingly heavy.

In a recent issue of the *Elektrotechnische Zeitschrift*, H. K. Schrage described a regulable three-phase shunt motor with simple brush-displacement speed control as built by the Allmänna Svenska E.A. under his Swedish patent 33,968. The new machine is cheap, simple and capable of continuous speed regulation over a wide range. Referring to fig. 2, P again represents the primary, R the regulating and S the secondary winding, but in this case P and R are carried by the rotor and S by the stator. The primary winding is fed through slip-rings from the mains; R is a ring winding with commutator, and S comprises three distinct phases, each connected across a pair of brushes on the regulator commutator. The *a* brushes are carried on one rocker, and the *b* brushes on a separate rocker.

If the brushes of each secondary phase are brought up to the same commutator segment, S_1, S_2 and S_3 are short-circuited, and the machine runs as an ordinary induction motor. On displacing the develop a high starting torque without the connection of starting resistance in the secondary circuit.

TABLE II.—ASYMMETRIC BRUSH DISPLACEMENT.

66/22 KW., 220 volts, 50 cycles, 720/240 R.P.M. Schrage motor.

Brush position.	Output, H.P.	Speed, R.P.M.	Power factor.
I	15	730	0·80
	45	720	0·98
	90	690	0·99
II	15	500	0·43
	45	490	0·75
	90	475	0·81
III	15	300	0·92
	45	200	0·55
	90	—	—

Commutation.—Considering two motors of equal output, identical leading dimensions and arranged for 1 : 3 speed variation (50 per cent. above and below synchronous speed) by controller and brush displacement respectively, the commutator voltage is only half as

great in the latter as in the former case. In the controller motor, the E.M.F. F_r induced, by the rotating field, between adjacent commutator bars varies directly with the slip, and is maximum at standstill and zero at synchronism. In the Schrage motor, however, F_r is constant at all speeds. Sparking is more serious at high than at low speeds in controller motors, owing to the influence of the commutating E.M.F. E_c; the latter is much smaller in Schrage motors, since the current to be commutated is only half as great, and since the regulating winding lies over the primary winding in the slots, which can, therefore, be widened at the top to reduce the inductance of the regulating winding. On starting,

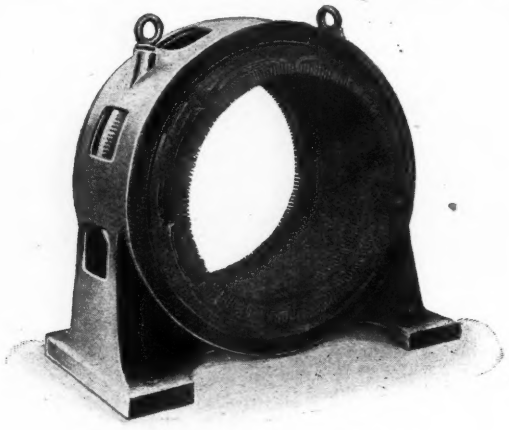


Fig. 4.—Stator of Schrage Motor.

the potential difference between bars is only half as great in the Schrage as in the controller motor; at maximum speed, F_r is the same in each case, but E_c is much smaller in the Schrage motor, which is, therefore, at least as good as the controller motor from the commutating standpoint under all circumstances.

Applications.—Schrage motors can be applied wherever regulable D.C. shunt motors would be applicable; the field of the latter is variable, but the field of a Schrage motor is constant, hence this machine yields the same torque at all speeds. One very advantageous application of the new motors is in works where only three-phase current is available, where constant-speed motors are chiefly required and where a few regulable machines are needed.

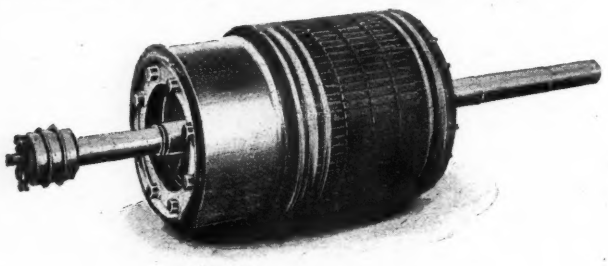


Fig. 5.—Rotor of Schrage Motor.

As compared with Ward-Leonard equipment, Schrage motors offer the advantages of lower prime cost, higher efficiency and less space occupied. If the torque required at the lower speed is small (as in fans), the motor may be arranged with symmetrical brush displacement. On the other hand, if the motor is to develop a high starting torque and to have a good overload capacity at low speeds, an unsymmetrical brush displacement can be arranged, at least in large motors. Small machines start well with symmetrical brush displacement. A large number of Schrage motors are said now to be in use in a variety of services. They are made by the Allmänna Svenska Elektriska Aktiebolaget, whose London office is at Norfolk House, Cannon Street, E.C.

TRADE STATISTICS OF EGYPT, 1913.

The following statement, showing the imports of electrical and similar goods into Egypt during the year 1913, is taken from the recently-issued trade statistics. The figures for 1912 are added for purposes of comparison, and notes of any increases or decreases are given:—

Rails.—	1912. £E.	1913. £E.	Inc. or dec.
From Great Britain ...	35,000	106,000	+ 71,000
,, Germany	60,000	20,000	— 40,000
,, Belgium	21,000	59,000	+ 38,000
,, Other countries ...	—	—	—
Total	116,000	185,000	+ 69,000

Steam engines, including boilers, etc.—	1912. £E.	1913. £E.	Inc. or dec.
From Great Britain ...	97,000	128,000	+ 31,000
,, Germany	15,000	7,000	— 8,000
,, Belgium	—	500	+ 500
,, France	4,000	8,000	+ 4,000
,, United States ...	1,000	500	— 500
,, Holland	2,000	6,000	+ 4,000
,, Italy	8,000	11,000	+ 3,000
,, Switzerland ...	5,000	2,000	— 3,000
,, Austria-Hungary ...	15,000	20,000	+ 5,000
,, Other countries ...	3,000	—	— 3,000
Total	150,000	183,000	+ 33,000

Electric machinery (including petrol and benzine motors).—			
Total	181,000	212,000	+ 31,000

Electrical machinery.—			
From Great Britain ...		15,000	—
,, Germany		8,000	—
,, Austria-Hungary ...	Not	3,000	—
,, Belgium	shown	6,000	—
,, United States ...	separately	3,000	—
,, France		27,000	—
,, Italy		3,000	—
,, Other countries ...		1,000	—
Total		66,000	—

Petrol and benzine motors.—			
From Great Britain ...		62,000	—
,, Germany	Not	31,000	—
,, Italy	shown	22,000	—
,, Switzerland ...	separately	29,000	—
,, Other countries ...		2,000	—
Total		146,000	—

Other machinery (except agricultural).—			
From Great Britain ...	88,000	103,000	+ 15,000
,, Germany	49,000	36,000	— 13,000
,, Austria	4,000	7,000	+ 3,000
,, Belgium	4,000	4,000	—
,, United States ...	42,000	30,000	— 12,000
,, France	39,000	36,000	— 3,000
,, Italy	3,000	5,000	+ 2,000
,, Switzerland ...	4,000	9,000	+ 5,000
,, Turkey	2,000	1,000	— 1,000
,, Holland	3,000	2,000	— 1,000
Total	238,000	233,000	— 5,000

Railway and tramway carriages.—			
From Great Britain ...	22,000	2,000	— 20,000
,, Germany	4,500	5,000	+ 500
,, Austria	42,000	21,000	— 21,000
,, Belgium	28,000	20,000	— 8,000
,, Other countries ...	2,500	—	— 2,500
Total	99,000	48,000	— 51,000

Lamps of all kinds.—			
From Great Britain ...	7,000	6,000	— 1,000
,, Germany	20,000	21,000	+ 1,000
,, Austria	32,000	29,000	— 3,000
,, Belgium	1,000	—	— 1,000
,, France	11,000	6,000	— 5,000
,, Italy	1,000	1,000	—
,, Sweden	6,000	7,000	+ 1,000
,, Holland	1,000	2,000	+ 1,000
,, Other countries ...	—	1,000	+ 1,000
Total	79,000	73,000	– 6,000

Copper manufactured.—			
From Great Britain ...	17,000	11,000	— 6,000
,, Germany	16,000	20,000	+ 4,000
,, Belgium	1,000	2,600	+ 1,600
,, France	18,000	17,000	— 1,000
,, Italy	7,000	6,000	— 1,000
,, Other countries ...	2,000	3,000	+ 1,000
Total	61,000	59,000	— 2,000

Copper, hammered, drawn or sheet.—			
From Great Britain ...	160,000	96,000	— 64,000
,, Germany	11,000	15,000	+ 4,000
,, Belgium	2,000	600	— 1,400
,, France	11,000	1,000	— 10,000
,, Other countries ...	—	400	+ 400
Total	84,000	113,000	— 71,000

	1912. £E.	1913. £E.	Inc or dec.	
India-rubber and gutta-percha, raw or manufactured.—				
From Great Britain ...	8,000	12,000	+	4,000
,, Germany	16,000	15,000	—	1,000
,, Austria	4,000	4,000		—
,, France	12,000	8,000	—	4,000
,, Italy	3,000	10,000	+	7,000
,, Switzerland	1,000	—	—	1,000
,, Belgium	1,000	1,000		—
,, Other countries ...	1,000	2,000	+	1,000
Total	46,000	52,000	+	6,000
Electric, telegraphic and telephonic apparatus.—				
From Great Britain ...	57,000	46,000	—	11,000
,, Germany	20,000	25,000	+	5,000
,, Austria	26,000	15,000	—	11,000
,, Belgium	5,000	7,500	+	2,500
,, United States ...	1,000	1,000		—
,, France	13,000	19,000	+	6,000
,, Italy	3,000	3,000		—
,, Sweden	5,000	18,000	+	13,000
,, Switzerland	3,000	4,500	+	1,500
Total	133,000	139,000	+	6,000
Scientific instruments.—				
From Great Britain ...	17,000	20,000	+	3,000
,, Germany	16,000	21,000	+	5,000
,, Austria	1,000	1,000		—
,, United States ...	2,000	2,000		—
,, France	13,000	14,000	+	1,000
,, Italy	1,000	1,000		—
,, Switzerland	1,000	1,000		—
,, Other countries ...	2,000	2,000		—
Total	53,000	62,000	+	9,000

£E = £1 0s. 6½d.

THE ELECTRIC VEHICLE COMMITTEE.

In order to keep possible users of the electric commercial vehicle in touch with the advantages and developments in connection with it, it has been decided by the Committee to publish quarterly an official journal, the first number of which is expected to be available in October, when copies will be mailed free to town clerks, the heads of electric supply undertakings, city and borough engineers, medical officers of health, superintendents of cleansing departments, boards of guardians, railway companies, and others. Electricity supply departments will be able to purchase, at cost, further copies for distribution amongst their consumers.

The Committee has in hand a series of mail cards dealing with the special features of merit of the electric vehicle.

The standard plug which the Committee recommends is specified and a drawing given herewith. This design is being submitted to the British Section of the International Electrotechnical Commission with a recommendation for standardisation.

At a meeting held on the 17th inst., the secretary was able to announce contributions amounting to a little over £100 as having been already received or promised towards the fund for carrying on the Committee's work. For use outside charging stations and outside garages where charging facilities are provided, a final design of standard electric sign has been approved and will be published shortly.

The Committee is of opinion that in the case of lead batteries a voltmeter and an ammeter should be provided on electric vehicles for controlling the charge and discharge. Where, however, it is not proposed to remove the battery from the vehicle for the purpose of charging, and in cases where no constant attendance is provided during this operation, it is recommended that an ampere-hour meter should be provided in addition to the ammeter in order to show the condition of charge of the battery, and that provision should be made in connection with it for automatically opening the circuit when the battery is fully charged. An instrument is on the market which is provided with an auxiliary contact for this purpose. In the case of batteries of the Edison type, an ampere-hour meter is the only instrument which need be provided. The Committee considers also that a mileage recorder is a necessary accessory for judging the condition of the battery in conjunction with the electrical instruments, and for preserving accurate records of the working of the vehicle. The Committee has been informed that mounting these instruments direct on the dash-board has not proved satisfactory hitherto, and the latest practice in America is to have them fixed on a strong steel pillar well in view of the driver, and distinct from the dashboard.

Information as to charging equipments is being prepared for the Committee by two of its members who are representatives of the B.E.A.M.A.

Specification for Charging Plug, Receptacle and Cable.

1. *Purpose.*—The plug and receptacle are recommended for standardisation, for use in connection with the charging of batteries of electric vehicles in charging stations, or in garages where charging current is available.

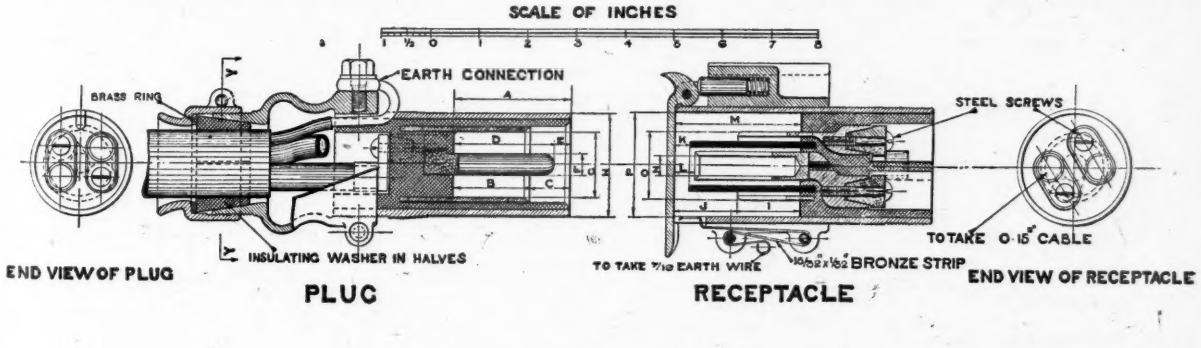
In order to ensure easy, quick and safe connection to the charging board, each battery vehicle should be fitted with the standard receptacle, and it is recommended that the latter should be placed in such a position under the front of the driver's seat that he will, of necessity, have to remove the plug, together with its cable connection, before he can take his seat and start the vehicle. It is recommended also that a standard receptacle and plug should be used to attach the charging connection (or cable) to the charging switchboard or charging circuit in the charging station or garage, so that, when not in use, the charging connection, with plug attached to each end, may be coiled away in a safe place.

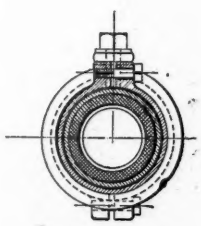
The fixed receptacle, *i.e.*, that on the charging switchboard or circuit, should be in an accessible position and fixed horizontally.

2. *Capacity.*—The plug and receptacle are designed to carry safely a current of 150 amperes continuously. They may also safely be used for boosting charges for an hour or two up to a maximum of 300 amperes.

Interruption of Circuit.—While the plug may, in cases of emergency, be used to break circuit with the comparatively low voltage for which it is intended, *i.e.*, in the neighbourhood of 120 volts, it is recommended that the circuit should always be broken on a suitable quick-break switch provided for the purpose, and not broken on the plug.

Earthing.—It is recommended that the metal shell of the plug, as well as that of the receptacle and the framing of the vehicle chassis, should be efficiently earthed. To enable this to be done, the recommended standard design incorporates a special earthing contact finger on the receptacle. It is suggested that this contact finger should be made of hard-rolled phosphor-bronze strip. The





CONTACTS MUST BE ACCURATELY CONCENTRIC TO INSURE INTERCHANGEABILITY

CAPACITY	MEASURE	A	B	C	D	E	F	G	H	I	J	K	L	M	N	N	O	O	P
-150-	ENGLISH in.	2 3/8	1 9/16	13/16	2 1/16	5/16	.425 .427	1.408 1.408	2.10	1 13/32	1 3/16	5/16	7/16	2 25/32	.437 .439	.422 .427	1.404 1.406	1.416 1.421	2 1/8
AMPS	METRIC m/m	60·33	39·69	20·64	52·39	7·94	11·04 11·10	33·74 33·76	53·34	35·72	33·34	7·94	11·11	69·06	11·10 11·15	10·72 10·81	35·69 35·77	35·97 36·09	55·86

POLARITY- OUTSIDE CONTACT POSITIVE INSIDE CONTACT NEGATIVE

TERMINALS SHOULD BE LARGE ENOUGH TO RECEIVE 0·15" CABLE

TERMINALS ARE TO BE MARKED + AND - TO CORRESPOND TO POLARITY OF CONTACTS AS ABOVE

Charging Plug and Receptacle Recommended for Standardisation in Connection with Electric Battery Vehicles.

fixed end of this finger is prolonged to form a socket terminal, into which a 7/16 S.W.G., or equivalent section, bare copper conductor can be sweated, the other end of the conductor being clamped to some part of the metal frame-work of the chassis, and, in the case of the charging board receptacle, being clamped to a common earth terminal which is efficiently connected to a water service pipe.

A three-conductor flexible cable should be employed, the third conductor being the earthing wire, the size of which should be equivalent to 7/16 S.W.G.

3. *Construction of Receptacle and Plug.*—The shell of both receptacle and plug should be made from solid-drawn mild-steel tubing, turned and bored to the dimensions specified on the accompanying drawing.

The bracket and cap for the receptacle are to be made in malleable cast-iron.

The spring plunger for keeping the cap closed over the opening of the receptacle, when the plug is not in place, is to be of hard-rolled brass rod, with a tempered steel helical spring in the socket at the back.

The malleable cast-iron bracket is to be bored out to receive the receptacle, the shell of which is to be turned smooth on the outside. The shell of the plug is also to be turned smooth on the outside, and finished bright, so that good contact may be made on it by the earthing contact finger of the receptacle.

The main contact pieces of both receptacle and plug are to be made of gun-metal, secured by being moulded into the insulating material, which latter should be capable of satisfactorily withstanding heat and moisture. The insulating material should also have ample mechanical strength.

The gun-metal cable lugs are to be provided with conical projections, which are to be made to fit accurately into the conical recesses in the backs of the contact pieces without bottoming in them. These cable lugs are to be fixed in place by steel screws, which should be of such length that not less than half of the length of the screw is in the tapped hole of the contact piece when the screw is fully home.

4. *Flexible Conductor, Cable Gripping Device, &c.*—Plugs for garages and charging stations should be provided with terminals and cable grips suitable for three-core flexible cable, having a sectional area of 0·15 sq. in. in each of the two main conductors, and not less than 0·0229 sq. in. (equal to 7/16 S.W.G.) in the third or earthing conductor. The approximate overall diameter of this cable is 1·75 in. For use in private garages in connection with cars fitted with lead plate batteries, it is not usually necessary to provide for the heavy boosting charges such as may be given to cars provided with Edison batteries, and, consequently, a smaller section of three-core flexible cable may be conveniently employed. It is, therefore, recommended that two alternative sizes of terminals and cable-grips should be standardised for three-core flexible cable having sectional areas in the main conductors of :—

(*a*) 0·10 sq. in.	Approximate overall dia.	1·5 in.
(*b*) 0·075 sq. in.	" " "	1·31 in.

(The third or earthing conductors always having the sectional area previously mentioned).

The design recommended for the cable-gripping device is indicated on the drawing. It consists of a sleeve made of either gun-metal or malleable cast-iron screwed on to the back portion of the plug. The sleeve is to have a terminal, as shown, to which the earthing conductor may be attached. The conical insulating split sleeve, forming the packing in the gland, must be made accurately to fit the cable.

It is recommended that the three-core flexible conductor should be provided with special hard rubber protection of the type known as cab-tire sheathing, which is a material now supplied by most British firms.

5. *Polarity.*—It is recommended that the centre contact of the plug and receptacle shall always be the negative pole.

Bennis Stokers.—Messrs. Edward Bennis & Co., Ltd., of Little Hulton, in their contract list for the past few weeks, report, in addition to a large amount of home business, orders for their machine-stokers from Switzerland, and for their chain grates with the new patent link for New Zealand and Constantinople. Messrs. Cammell Laird & Co., Ltd., of Birkenhead, who are particularly busy, have placed an order for four sprinkling stokers and self-cleaning compressed-air furnaces for 8 ft. dia. Lancashire boilers, together with an elevator and shoots to serve the machine-stokers. The municipal electric light and power stations of Rotherham, Worksop and Burton-on-Trent have placed orders for machine-stokers and self-cleaning compressed-air furnaces, and Manchester (Bloom Street and Stuart Street stations) for the re-linking of chain grates of another make. The list before us includes an imposing collection of contracts for stokers for woollen mills, steel works, dye works, oil works, chemical works and collieries.

Inert Cells.—We are informed that our reference to the new "Inert Cell" of Messrs. John C. Fuller & Son, Ltd., in our issue of the 11th inst., was slightly incorrect. The cell is not identical with the types which the company is supplying to the War Office and the Admiralty, but an improvement on these types. The company is willing to supply free samples of the new cell to large users

FOREIGN AND COLONIAL TARIFFS ON ELECTRICAL GOODS.

UNION OF SOUTH AFRICA.—The Customs Department of the Union of South Africa have notified a decision relative to the importation of wireless telegraphy apparatus. The general rate of duty leviable is declared to be 3 per cent. *ad valorem*, but there is a rebate of the whole of this duty on goods which are the manufacture of the United Kingdom or reciprocating British Colonies.

NEW PATENTS APPLIED FOR, 1914.

(NOT YET PUBLISHED).

Compiled expressly for this journal by Messrs. W. P. Thomson & Co., Electrical Patent Agents, 285, High Holborn, London, W.C., and at Liverpool and Bradford, to whom all inquiries should be addressed.

19,506. "Electric condensers." W. H. Wilson. September 7th.

19,517. "Magnet-chargers." P. Lynch, H. Wochner, & F. W. Sauermann. September 7th. (Complete.)

19,538. "Electrophones." E. W. Schneider & E. H. Stolz. September 8th. (Complete.)

19,556. "Connections suitable for conduits containing electric conductors." J. W. Manley & W. J. L. Sandy. September 8th.

19,569. "Magnetos as applied to the ignition of internal-combustion engines." W. E. Dawson. September 9th.

19,587. "Electric-circuit interrupting means." British Thomson Houston Co., Ltd. (General Electric Co., United States). September 9th.

19,505. "Electric switches." F. B. Holt. September 9th.

19,598. "Electric switches." F. B. Holt. September 9th.

19,601 "Electrical switches or circuit breakers." F. B. Holt & E. O. Moller. September 9th. (Divided application on 23,247/13, April 14th, 1914.) (Complete.)

19,620. "Fittings for electric incandescent lamps and the like." W. E. Shuttleworth. September 10th.

19,630. "Apparatus and method for transient augmentation of voltage of electric currents." J. E. Taylor. September 10th.

19,637. "Terminals for electrical conductors." A. J. Hedgcock, E. C. Mann, & W. T. Henley's Telegraph Works Co., Ltd. September 10th.

19,674. "Dynamo-electric machinery." J. H. Potter & L. Perks. September 11th.

19,679. "Electric hand lamp." T. E. Dickinson. September 11th.

19,700. "Electric switches or circuit-breakers." F. B. Holt & H. Smith. September 11th. (Divided application on No. 24,593/13. October 29th.)

19,704. "Semi-automatic telephone systems." Betulander Automatic Telephone Co., Ltd., & T. Skerratt. September 11th.

19,705. "Telephone systems." Betulander Automatic Telephone Co., Ltd., & F. M. Ward. September 11th.

19,706. "Automatic and semi-automatic telephone systems." Betulander Automatic Telephone Co., Ltd., & D. C. Crowe. September 11th.

19,729. "Electric incandescent lamps." Deutsche Gasgluhlicht Akt. Ges. (Augeres.) September 12th. (Convention date, September 13th, 1913, Germany.) (Complete.)

PUBLISHED SPECIFICATIONS.

Copies of any of the Specifications in the following list may be obtained of Messrs. W. P. Thompson & Co., 285, High Holborn, W.C., and at Liverpool and Bradford; price, post free, 9d. (in stamps).

1913.

19,019. Train or like Signalling and Control Systems. F. W. Prentice & B. Starie. August 21st.

19,020. Train or like Signalling and Control Systems. F. W. Prentice & B Starie. August 21st.

19,249. Party-line Telephone, Telegraph or Signalling Systems. H. Hull. August 25th. (August 26th, 1912.)

19,388. Electric Switches. J. H. Tucker. August 27th.

19,669. Electrolytic Recovery of Metals from their Solutions and apparatus therefor. U. C. Tainton & M. F. L. A. Aymard. August 30th.

19,752. Electric impulse producing mechanism. Western Electric Co. (Woodward, acting for Western Electric Co.) September 1st.

20,618. Automatic Railway Signalling and the like. G. Mumford. September 12th.

23,137. Automatic Telegraph Transmitters. E. Thompson. October 13th.

25,795. Electrically-operated Diaphragm Horns and the like. W. A. Crosbee, F. S. C. Crosbee, and T. S. Rogers. November 11th.

26,367. Holders for Electrodes of Electric Arcs. H. Ayrton. November 17th.

29,070. Electrically-heated Utensils. W. F. Perry and Credenda Conduits Co. December 16th.

29,165. Telephone Transmission Systems wherein Reinforcing Repeaters are employed. A. S. J. Van Kesteren. December 16th. (December 19th, 1912.)

29,425. Globes for Electric Arc Lamps. T. Stave. December 20th. (December 23rd, 1912.)

1914.

767. Telephonic Systems. E. A. Graham & E. A. Sanftleben. January 10th.

1,062. Process for manufacturing a mass of Higher Oxygen Compounds of Nickel for use in the Positive Electrodes of Alkaline Accumulators. Svenska Ackumulator Aktiebolaget Jungner. January 14th. (January 16th, 1913.)

1,252. Electric Incandescent Lamps. G. M. J. Mackay. January 16th. (September 8th, 1913.)

2,118. Electric Griller or Toaster. G. Pate & A. R. Wood. January 27th.

2,624. Microphones for use with strong currents. Fratelli Marzi de G. B. (firm of). January 31st. (April 10th, 1913.)

2,924. System of Synchronising Electric Clocks. C. E. O'Kennan. February 4th. (February 5th, 1913. Patent of Addition not granted.)

4,010. Production of Electrolyte Matrices. J. H. Mullaly. February 16th.

10,061. Electric Furnaces. A. L. J. Quenau. April 23rd

12,641. Dynamo-electric Machines. N. W. Storer. May 22nd. (May 22nd, 1913.)